GAS JOURNAL

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THE GAS ACT

THE House of Commons considered the House of Lords' amendments to the Gas Bill last week. First, the Minister of Fuel and Power moved to disagree with the Lords' amendment designed to secure that at least one member of every Area Board should be a worker employed in the gas industry in the area covered by the undertakings taken over by the Board. The Government, he said, held that the Minister should be responsible for those appointments and should not be unduly fettered in making them. They did not think it desirable that workers' representatives should be elected to those Boards. If that were to be the procedure there would be a clash of responsibility and interest so far as the workers were concerned. An Area Board might employ 10,000 or 20,000 men and he could not see that two persons elected by this number of employees would really be able to report back in any regular form to their constituents. The Government did not want to have people on these Boards who felt themselves responsible to the workers and not the consumers. The amendment was an untenable compromise based on a confusion of thought about the nature of industrial democracy. The Government felt it was of the utmost importance that the workers in the industry should feel themselves a part of the show, but he did not feel that even if they were to elect workers' representatives—or appoint so-called workers' representatives—that would achieve the result they wanted. Once a man was appointed to a full-time position he would simply be a member of the Board. What was needed was consultation at every level, where workers could confer with the management on all the problems of the industry which affected the worker. The Opposition did not divide the House on this, but Mr. Walter Elliot described it as a partial attempt to put some industrial democracy into the Bill.

The amendment providing that there should be at least three full-time members on each Area Board, however, was taken to a division. Mr. Gaitskell argued that there was a danger that if there were too many full-time members the Board might become of the functional type which was much criticized at the moment. He did not think it right to commit all his successors by the amendment. Mr. Nigel Birch said he did not see how there could be personal contact between those who were running the industry at top level and those running individual works unless there were enough full-time people who could travel around and see what was happening. The Government's motion was carried by 255 votes to 109.

The Government also rejected the Lords' amendment to change the basis of compensation for gas stockholders to reasonably maintainable annual income multiplied by an agreed number of years' purchase, and put back the original basis of Stock Exchange values. For the Opposition, Mr. Walter Elliot warned the Government that its whole attitude over the question of compensation was not commending itself to the country, and said that the people were becoming increasingly anxious with regard to the future of their savings. He wanted to know if quotations of gas stocks that were more than three months old would be used for valuation purposes; if those shares that were not quoted at all would be given a fair valuation and not merely one based on the nearest analogous case; and also, if the tribunal dealing with valuation would pay regard to all the relevant factors. To these points Mr. Glenvil Hall, Financial Secretary to the Treasury, replied that they were all dealt with in the Bill—some as a result of amendments made during its passage. The new terms of compensation put forward by the Lords, Mr. Hall described as a challenge to the main basis of compensation laid down not only in the Gas Bill, but also in the Transport and Electricity Bills. Col. Crosthwaite-Eyre declared that what had happened to the compensation stocks already in issue showed how unfair the terms were. In its support of Stock Exchange values the Government was alone—the T.U.C., the Stock Exchange Council, and the shareholders were against them. The Government motion to disagree with this Lords' amendment was carried by 274 votes to 92. The Lords' amendment that the Central Guarantee Fund should be invested in trustee securities was also rejected—by 273 votes to 84—but Mr. Glenvil Hall gave an assurance that it was not intended that the Fund should be invested in long-dated or irredeemable stocks. The amendment to impose on the Area Boards the duty to continue to take part in any machinery for the promotion of industrial co-operation that was now a part of any co-partnership scheme was also turned down on a division, while the amendment designed to prevent the Minister from limiting the right of any person to choose available sources of fuel or power was rejected by 276 votes to 87. The amendment, said the Solicitor-General, meant nothing at all. Under the Bill, once there was an available source of fuel and power, then the consumer's rights of access to it were governed by the express terms of the Third Schedule, and the Minister could not interfere with his rights to that available source. This concluded consideration of the Lords' amendments.

On July 28 the Lords considered the foregoing Commons' amendments, and the Lord Chancellor, Viscount Jowitt, accepted a new amendment moved by Viscount Swinton. This amendment, while accepting the Government's contention that Stock Exchange quotations should be the basis of compensation, provides that a quotation shall be disregarded for the purpose of valuation unless business was recorded at any time during the six months immediately before the specified dates. A further Opposition amendment accepted by the Government stipulated that in valuing undertakings for which there were no Stock Exchange quotations, the arbitrator should take account of all relevant factors. The Government also accepted an Opposition amendment designed to extend consideration for extra compensation to those companies which suffered loss of revenue due to war

causes, to include the year 1945. On consideration of the Commons' reason for rejecting the Lords' amendment designed to continue schemes for promoting industrial co-operation between employed and employers, the Government was pressed to state definitely whether they believed in co-partnership or not. To this the Lord Chancellor replied that it was not that they objected to co-partnership as such. He was willing to continue these schemes and everything attached to them, but he was not prepared to continue schemes in the abstract for promoting industrial co-operation at a time when the entity of the employer was altered by the fact that it was merged into Area Boards. The amendment was not insisted upon and consideration of the Commons' reasons for rejecting the amendments was concluded.

The Bill, having received the Royal Assent, has now emerged as an Act. We have treated the somewhat painful and at times somewhat confused metamorphosis comprehensively in the pages of the "JOURNAL"—our treatment of this all-important phase in the history of the British gas industry constituting a combined commentary and pocket Hansard. We shall return to a general survey in these columns in our issue next week.

COALS FOR THE GAS INDUSTRY

THE gas industry has for some years applied its collective mind to the problem of determining which types of coals are most suitable for the plants that it has at its disposal. In some works, quite properly, test plants have been erected to ascertain gas-making and other yields from coals that have been offered by industrious salesmen. Greatly daring, some gas engineers have used blends of caking with non-caking coals and have reaped benefits in some directions, while simultaneously, or at least with a short time-lag, finding those benefits to be removed at the colliery end by adroit manipulations of the price structure of the coals supplied to them. The great majority of gas engineers, however, have been content to find coals that give good yields of gas without causing much trouble in use, and have gratefully accepted such gifts as from the gods, when forthcoming. Some far-sighted spirits—a very few—have allowed themselves to wonder whether the future supply of gas coals is assured. Ever since "carrying coals to Newcastle" became the proverbial expression (or is it the cliché?) for superabundance in an over-stocked market, the idea of any part of Britain being without coal has seemed absurd. The wars and the almost equally terrible peace that has followed them have taught us that in a planned economy there is no such thing as plenty. Faced with shortage of coal and compelled to carbonize a great proportion of unsuitable coals, the gas industry has permitted itself to wonder aloud whether its supply of coals is as assured as it once seemed to be. Fortunately, the foresight of Directors of Fuel Research who are no longer with us has provided in the Coal Survey the means of obtaining an answer to this problem.

The value of the Coal Survey has not been fully realized. It has worked year by year in out-of-the-way corners of the coalfields. Publishing now and again monographs of high value, but not altogether intelligible to the average citizen who has not been engaged in coal mining, the Coal Survey has somehow failed to impress people with the true value of its work. But that value is becoming evident, and it immediately becomes crystal-clear when it is interpreted to us by those who know the meaning of its findings. Thus, it was a happy thought which inspired Dr. J. G. King, himself a former colleague of those who worked in the Survey, to apply this available published information to the qualitative assessment of the reserves of coals of different types, and in particular of those types that are required for modern gas-making plants. The result is comforting, so far as the present generation of gas engineers is concerned, and perhaps for their grandsons and their great-grandsons. After that—perhaps the least said the better. "In industry as a whole," says Dr. King, "the prospect of reasonable continuity (of the present types of coal) for about 100 years should be more than sufficient for the present-day planning of new plant. . . . It would seem that the present planning does not involve the working out of any of these classes at a rate likely to disturb the balance seriously during the later end of the 100-year period." Nevertheless, the difficulty and particularly the expense of transporting coal over long distances must result in the extended and preferential use of local coals, and thus for the future the type of carbonizing plant adopted in any area seems likely to be governed by its power to use the local coals rather than by its other characteristics.

Price Structure and Mining Methods

This conclusion may be disturbed or at least affected by the new price structure of the coal industry. It will be freely admitted that the Ministerial short-cut of putting a flat rate of increase on every ton of coal of every grade and composition, good, indifferent, bad, and very bad, has caused manufacturers to demand the best coals as being now the cheapest. The highly complicated system that the N.C.B. is evolving may one day correct that, and the changes lately introduced *ex cathedra*, while deleterious to the gas industry and out of keeping with sound principles of fuel technology, will nevertheless go some way towards correcting the anomalies that have arisen in regard to boiler coal.

Whether the existing qualities of coal will continue to be in good supply does not only depend upon the types of coals mined. The methods of mining also have some bearing on the subject. The Report of the National Coal Board leaves us in no doubt of that. "Mechanical methods of cutting, handling, and conveying coal break it up more than the old methods did and produce more 'smalls.'" These smalls are harder to clean than the larger coal. It is important to realize that between the years 1930 and 1946 the percentage of the total output that is mechanically cut rose from 31 to 74, while that mechanically conveyed has risen from 17 to 73. This means more fines. Does it mean also that those types of retort which require graded coal, especially nuts and similar sizes, will give way to the horizontals?

The importance of keeping account of the characteristics of what coal is available makes it, in our view, a mistaken policy to place the Coal Survey under the National Coal Board. The change has been made, nevertheless, and we doubt whether the Coal Board will give up the Coal Survey. Admittedly, it would seem logical that the Coal Board should themselves be in a position to know what coals they have. But the nation wants that information also. The nation wants to know what is being done with particular qualities of coal, and by putting the Coal Survey under the N.C.B., the power to secure that information has been removed. Nor does the Report of the Coal Board make any reference to the continued availability to the general public of the information provided by the Survey. We are promised that the Coal Survey will maintain its links with other bodies, such as the Fuel Research Station and the D.S.I.R. But that is all. There is no promise that its findings will continue to be published as heretofore.

This matter is the more important because it appeared from the discussion on Dr. King's paper that there is a difference of opinion between the Coal Survey officers and "the rest" on the interpretation of such information as is now published. Dr. King, in addition to concluding that there is not likely to be any major change in the character of the coal mined in the next 100 years indicated that in his view there will be coal enough for the gas industry to expand by 2 to 2½ times its present extent within the next generation. Mr. Wandless, of the Coal Survey, put the figures much lower than that. He computed that taking the gas and coking industries together, we may be faced with a deficit of suitable coals, while the total quantity of gas coals to be mined annually and of types now regarded as

suitable for gas retorts is no more than 24·3 mill. tons. Dr. Parker, however, believed that the gas industry could be given enough suitable coal to permit of expansion by 50% within the next 20 years. With these differences of opinion on a simple issue, is it not essential that the nation as a whole should have the freest access to all relevant information?

Blending

One conclusion from the debate seems to be that more attention should be paid in the gas industry to the blending of coals. Published information shows that the qualities of coke can be improved by blending. Here, of course, the price structure enters into the picture, but assuming that the coal industry will adapt its policy to the exigencies of the situation and study to help its customers (as indeed we are confident will be the case) then technical factors and economics of blending as applied to the whole range of products derived from carbonization must be studied. Again we find a difference of opinion even on the technology of the subject. Dr. King has stated that "in all blending work, blend constituents must have the same size grading; this is particularly important if blending of the larger size grades is attempted." Mr. G. M. Gill, on the other hand, has pointed out that while this may be true of breeze blended with coal, in his experience close and similar size of the coals blended is not only unnecessary but undesirable if it is desired to produce an open, free-burning coke. It is not necessary to lose gas yield when blending coals. Some coals give a high gas yield and a hard, relatively incombustible coke; others give an equally high gas yield with a soft, friable but highly reactive coke; when blended that may produce both a good yield of gas and a highly suitable domestic coke.

The objective in blending is two-fold. In the first place, it is the improvement in the coke, and sometimes improvement in the carbonizing process as well. In the second place, the object may be to increase the range of suitable coals; *that* may one day be forced upon us by the growing shortage of gas coals. It is already being forced on the coking industry. Durham coking coals are already facing exhaustion, and if they can be eked out by using them for blending with inferior coking coals, so much the better.

A conclusion that "stands out a mile" from Dr. King's analysis is that there must be close co-operation between the gas industry and the Coal Board in respect of the availability of coals. Dr. King has indicated the reasons for this. "With a knowledge of quality, of the ash content and size grades, the National Coal Board would be able to assess the availability of the types and sizes required in each area and to arrange their distribution. Each gas area should know its probable coal supplies in order to avoid over-installing a type of gas-making plant that would mean "importing" coal unnecessarily, with a consequent increase of cost of transport. In assessing cost of transportation, it could be assumed that a given centre of gas production could use local coals and install only plant suitable for these coals if the coal reserves were adequate for the period of years involved." If, as we anticipate will happen, the gas industry uses blends of coals to produce coke of specific qualities, the need for co-operation will be not less essential since the type and accessibility of the requisite coals will depend upon factors that will generally be under the control of the N.C.B.

Nor must this co-operation stop at arrangements for supplying coals of the right size and class. The ash content is no less important. The first consideration must be the gas-making quality of the coal, and it will be interesting to see how this will be taken into account in the new price structure that is proposed. It is of very little use setting up a price structure based on calorific value on the assumption that that will be a universal measure of the value of a coal. Anthracite has the highest calorific value of all, and it is the worst gas-making coal known. "While the gas industry remains a two-fuel industry, providing both coke and gas, the first requirements are that the coal should be high in volatile matter, that its caking power should lie within certain limits, and its ash content should be low. There may even be a case for saying that it should be very low" (Dr. J. G. King). It is evident from the report of the N.C.B. that the steps towards implementing the recomendations for limitation of coal sizes drawn up well in advance of nationalization by the British Colliery Owners' Research Association are being taken. The problem of dirty coal is being recognized and tackled. The main solution lies in the provision of new coking plants, and these cannot be completed in their entirety for many years. The report states, however, that much is being done: "Taking the country as a whole, 45 new coal preparation plants with a capacity of about 14 mill. tons of coal a year and costing £5 mill. are operating, under construction, or ordered from manufacturers. . . . In addition . . . 140 new coal preparation schemes are under consideration to deal with about 60 mill. tons of raw coal annually. These will involve the Board in a considerable expenditure of capital—probably as much as £20 mill. or £25 mill." At this rate, gas coal should show a welcome, if overdue, improvement within the lifetime of this long suffering generation.

REFRIGERATORS

The sudden change in the weather last week lent topicality to a paragraph in "Parliamentary Notes" published in our issue to-day. On July 19 the House were informed that in the first four months of this year no less than £130,000 worth of refrigerator spares arrived in this country for the repair of refrigerators of foreign manufacture. There can scarcely be a doubt that such figures will continue to appear at question time, for refrigerators are continually subject to wear and tear and require to be adequately maintained if they are to give service to their owners. This subject of spare parts becomes more and more onerous as the years creep on, and only the complete scrapping of the worn out appliance will obviate frequent part replacement. There are many cars to-day that could be put on the roads were the spare parts available; but they are not, so the hapless owners manage to get their names on a waiting list for a new vehicle, and wait and wait. Many refrigerator owners are similarly placed. Certain spares for refrigerators are expensive, relatively, but owners who have become accustomed to cold foods and regard the refrigerator as a necessity will go to many lengths to keep it working. Besides, the prices of new models are very much up on pre-war prices, if one wanted to buy the latest. Thousands of names are on waiting lists up and down the country; thousands of families are still waiting for their gas refrigerator, which, all being well, will be fixed one fine day in their kitchens.

THERMAL EFFICIENCIES

We do not intend to indulge in any precise forecast of the time when the misconception regarding the thermal efficiency of carbonization and the thermal efficiency of electricity generation becomes rectified. These efficiencies are perennial plants of the hardiest kind and the issue will remain loosely in the minds of 99% of the population for very many years to come. All the professorial utterances during the past quarter of a century and more have done nothing to clarify the issue in the minds of those who know little about gas but who, on occasion, talk about gas industry affairs; and we do not think that those to whom these remarks are addressed will really suffer the loss of many nights' sleep on the issue. What makes us write this note on this subject were the comments of Lord Rochdale and Lord Lucas of Chilworth in the House of Lords when they were talking, presumably as laymen, on the highly technical question of the utilization of waste heat from gas-works and from electricity generating stations. Lord Rochdale suggested that the thermal efficiency of electrical generating plant is usually greater than that of coal carbonization, and Lord Lucas of Chilworth backed up Lord Rochdale by saying that he had in this respect spoken the truth—that there was a marked difference between thermal efficiency in electrical generating industry and the thermal efficiency in the gas industry. "If I may use the expression," he said, "there is waste in gas and therefore the heat utilization represents only a small percentage." We fail to follow His Lordship's argument and doubt

whether many of our readers will be able to do so. But we are sure that the contentions in this respect of Lord Rochdale and Lord Lucas of Chilworth will have very little bearing on the future progress of the gas industry or the electricity industry, and will in no way influence decisions which will be taken at high technical level regarding developments of both.

DOMESTIC ELECTRICITY CHARGES

At the request of the Minister of Fuel and Power, following recommendations of the Clow Committee, the British Electricity Authority and the Area Boards will increase the charge for electricity on domestic two-part tariffs for the three winter months, and reduce it for the other months relatively lower. The proposal aims at making a significant contribution to reducing the peak load. Other recommendations are concerned with the installation of various devices designed to regulate or measure the demand at peak periods. The Committee proposes that the B.E.A. and the Area Boards should in some cases proceed to install such devices as and when they can be produced. This, of course, is a form of compulsory rationing of a commodity in increasingly short supply and focusses attention on the need for a balanced fuel economy.

Personal

Mr. S. D. COOLE has been appointed Gas and Water Engineer and Manager to the Barry Corporation. Mr. Coole was previously Works Manager to the Cleethorpes Gas Company and went to Barry in 1942 as Deputy.

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Mr. D. A. BLANCHETTE, 18-year-old laboratory assistant at the Beckton Works of the Gas Light and Coke Company, has been awarded a Milne-Watson scholarship. He has been with the Company since October, 1947, and hopes to specialize in chemical engineering when he goes up to a university.

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After 60 years continuous service, Mr. E. E. LITTLE, a Director of Bell's Asbestos and Engineering, Ltd., has retired. He joined Bell's as an office boy in 1888 and among the many posts he has occupied with the firm is that of Chief Buyer. Mr. Little, who has served with four generations of the Bell family, was made a Director of the Company five years ago.

Obituary

The death occurred at Watford on July 26 of Sir CLIFFORD C. PATERSON, O.B.E., D.Sc., F.R.S., founder and for 30 years Director of the Research Laboratories of the General Electric Company at Wembley. He had recently returned from Australia, where he had been developing contact between British and Australian scientific bodies. For 17 years he was on the staff of the National Physical Laboratory before founding the G.E.C. Laboratories. He was a Past President of the Institution of Electrical Engineers, and Faraday Medallist in 1945. His wide experience in the field of research, extending over a period of 45 years, was always freely at the disposal of his younger colleagues, especially in the sphere of illumination. One of his last appearances in connexion with the gas industry was at a meeting of the London and Southern Junior Gas Association, at which he gave an informal and extremely valuable talk on various aspects of industrial research.

Diary

Sept. 9.—**North British Association of Gas Managers**: Annual Meeting, Cowdray Hall, Aberdeen.
Sept. 14.—**Federation of Gas Employers**: Central Committee, Gas Industry House.
Sept. 14-15.—**Irish Association of Gas Managers**: Annual Meeting Cork.
Sept. 22-23.—**Wales and Monmouthshire Association of Gas Engineers and Managers**: Autumn general meeting, Newport.

News in Brief

The Autumn General Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers will be held at Newport on Sept. 23. Golf and bowls competitions will be played on Sept. 22, and the meeting will be followed by a works visit.

Coal Exports from Britain during the week ended July 10 amounted to 439,000 tons—the highest weekly total this year, and 89,000 tons more than the weekly target figure set by the Minister of Fuel and Power in June. Total exports now amount to more than 7,350,000 tons.

The Belgian Minister of Fuel and Power, M. Delattre, recently distributed prizes to prizewinners in a competition arranged by the Council for Mining Hygiene. The Minister said a miners' home would soon be opened which would enable experts to do research work on miners' industrial diseases.

The Board of Trade Export Licensing Branch operating from 4, Fenchurch Avenue, has been moved to Regis House, King William Street, London, E.C.4 (Telephone Avenue 3111). The headquarters of the branch will remain at Stafford House, King William Street (Telephone Mansion House 4555).

The First Coal Cargo weighing 3,300 tons from the River Wear for Germany since 1939 had been loaded at Sunderland on the steamer *Jacob Maersk*. From Jan. 1, 1939, to the outbreak of war, the Wear sent about 230,000 tons of coal to Germany. Exports of coal from the Tyne to Germany are to be resumed on a small scale.

During the Six Months Ended June 30, 138,745 tons of gas coke have been exported from the United Kingdom. The corresponding tonnage for 1947 was 2,563. Other coke exports, including petroleum coke, dropped from 53,818 tons of that six-month period in 1947 to 33,124 tons this half year. Manufactured fuel exported this year amounted to 31,881 tons.

The Coventry Staff of George Wilson Gas Meters, Ltd., recently held two competitions with the works. On the first occasion a cricket match was played on the Riley Sports Field, when the staff managed to amass a total of some 60 runs; the workers made 100 for five wickets. On the second occasion a fishing contest was held at the Mill House Club, and again the works were successful.

Mr. Alfred Robens, M.P., Parliamentary Secretary to the Ministry of Fuel and Power, was a passenger on the Wandsworth Gas Company's m.v. *Mitcham* when it arrived at Wandsworth from Newcastle-upon-Tyne on July 20. He had made the journey in order to form a first-hand impression of the work of the North Sea collier fleet on which the coal supplies for London gas and electricity works largely depend.

Mr. Robert Baillie, who has been in the service of Kilmarnock Gas Department since almost the beginning of the century, has retired. He is the last of the " old stagers " who started work in the gas-works when the manufacturing centre was located at Park Street, now only a gasholder station. Mr. Baillie remembers well the transition period when the works were in process of building and development at the Riverbank site, and when for a few years, up till 1909, his duties alternated between the Langlands Street and the Riverbank Works. He worked under three Managers—Messrs. William and Charles Fairweather, and Robert Fife. On the occasion of his retirement Mr. Baillie was the recipient of gifts from staff and other employees of the Department.

The Liverpool Gas Company and the Liverpool Gas Development Centre have for some time been offering a service to schools which ties up with the lessons in the school curriculum on heat. Films such as " The Manufacture of Gas " and the " Treasure in Coal " have been shown extensively, while school parties have visited the gas-works. Large quantities of British Gas Council literature have been supplied in connexion with this scheme, but it became necessary to produce something for the younger children as a visual aid, and so " The Story of Mr. Therm " was evolved from an idea of Mr. Ralph Gregson, an architectural student at the Liverpool University. Many gas undertakings in the North Western District are ordering copies, which are available from the Liverpool Gas Company at 10d.-1s. each according to quantity.

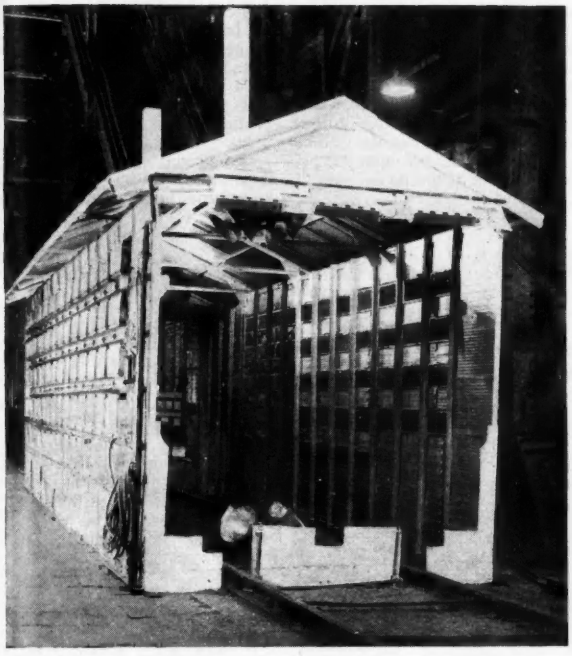
1948 " JOURNAL " DIRECTORY

In order to keep the Directory information up to date, the following alterations and corrections which have been notified during the past month should be noted in the 1948 issue of the " JOURNAL " Calendar and Directory.

Page 22.—CLAY CROSS.—Delete C. M'Pherson, *E. & M.* (deceased).
,, 22.—CLEETHORPES.—F. G. Brockway, *E. & MD.*, F. Janney, *S*;
,, 32.—GLOSSOP.—M. Hamshaw, *E. & M.*, vice B. Goddard.
R. T. Dyson, *S.*, vice W. Townend.
,, 42.—KIRKBY-IN-ASHFIELD.—C. W. Illingworth, *E. & M.*, vice A. Mawson.
,, 50.—MELTHAM.—P. R. R. Stead, *M.*, vice F. Beaumont.
,, 90.—FAULDHOUSE.—D. Gillespie, *M.*, vice J. Morrison.

VISIT TO ROYAL ORDNANCE FACTORY

Representatives of the gas industry were among those who were invited to accompany Mr. Jack Jones, M.P., on a visit to the Royal Ordnance Factory, Dalmuir, on July 23, when an infra-red tunnel for drying the railway wagons assembled in the factory was inspected. Seventy of these 16 ton mineral wagons are assembled each week in the factory and 28 pass through the tunnel daily, 14 after their first coat of paint and 14 after their second coat.



The De La Rue infra-red tunnel at Dalmuir

The tunnel, designed by Thomas Potterton (Heating Engineers), Ltd. (De la Rue Gas Development, Ltd.), was built by the factory's own labour and is the largest in the world, with 144 panels. It is 36 ft. long and 10 ft. 8 in. high, the panels being fitted on the side. The length was determined by the fact that the tunnel had to be open-ended, with the area of radiation in excess of the size of each wagon. As it was impracticable to use screens or doors at each end to preserve the high air temperature, the wagons themselves are used to block the entry and exit from the tunnel. During the drying period, therefore, the truck to be dried is in the centre of the tunnel, the rear half of the truck previously dried being in front and the front half of the next wagon to be dried being in the rear, thus conserving heat losses. The wagons are moved by a shunting locomotive or windlass over the normal permanent way, the whole line moving together. As each wagon enters the centre section of the tunnel the line stops for 15 minutes, this being the time taken to dry the paint film.

In accordance with usual practice, each bank of panels is separately controlled and the pressures are graduated according to the position of each horizontal bank. This allows the radiation to be intensified or decreased according to the temperature required on different parts of the wagon. The pressure is maintained at a pre-determined figure by the gas pressure governor which is installed in the gas supply service to the tunnel. The sheeting of the wagons is ½ in. steel and the panel temperature (over 900° F.) is adequate to raise it to the temperature required.

It was pointed out to the visitors that the paint used was of the usual air drying variety, theoretically not suitable for infra-red processing, and that other types of finishes are preferable.

Radiant efficiency of the Potterton panel is high (over 40%) and this, together with the convected heat in the tunnel, is sufficient for the task. The drying time of 15 minutes is long by infra-red standards but has to be compared with previous drying times of from 18 to 72 hours, dependent on the weather. The long drying time was producing a bottle-neck which the tunnel was designed to eliminate.

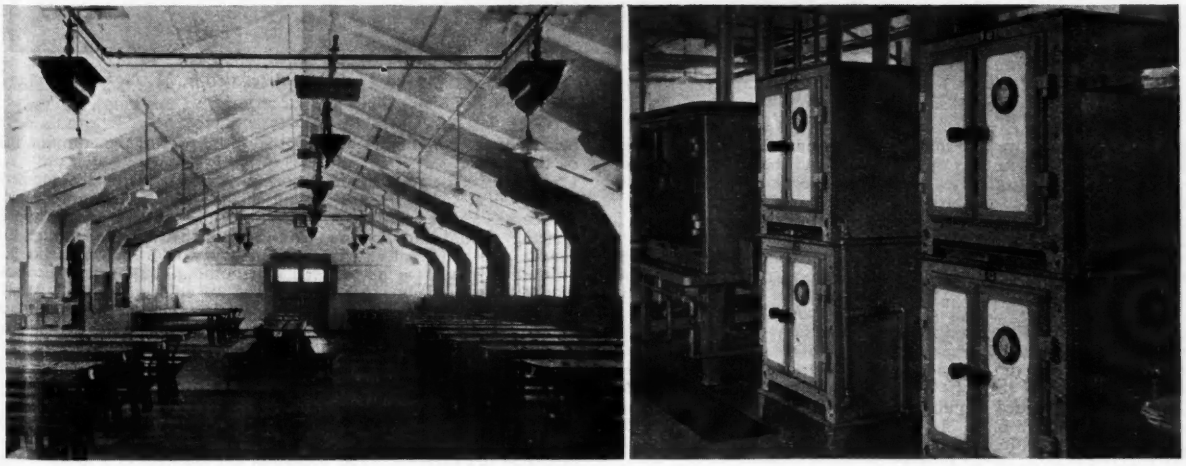
The deputation from the gas industry was headed by Mr. R. D. Keillor, Greenock, and Mr. A. Bujnowski, Glasgow.

GREY IRON CASTINGS

The British Standards Institution has published B.S.1452: 1948 for grey iron castings, which constitutes a revision and combination of B.S.321 "General grey iron castings," and B.S.786 "High duty iron castings." This standard covers the requirements of seven grades of grey iron castings, viz., Grades 10, 12, 14, 17, 20, 23, and 26. The grades are numbered in accordance with their tensile strength on a 1.2 in. diameter test bar.

Methods of test, dimensions of test bars, and test requirements are specified and details are provided relating to the process of manufacture, moulding, freedom from defects, the provision of test bars, inspection and testing facilities. The appendices include a summary of testing requirements, the calculation of transverse rupture stress and the factors for the calculation of breaking load, transverse rupture stress, deflection for a test bar of standard diameter. Copies of the standard can be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, at a cost of 2s. 6d., post free.

GAS EQUIPMENT AT BUCKIE HIGH SCHOOL



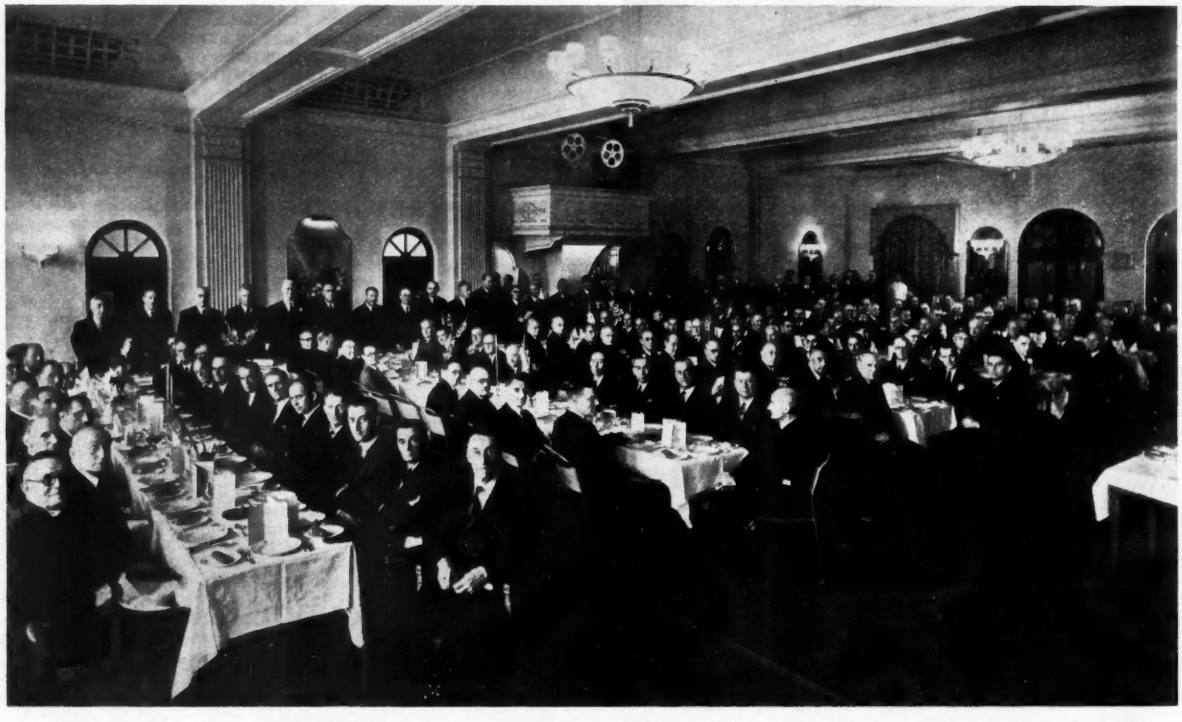
The Buckie Gas-Light Company, Banffshire, has installed all-gas cooking and heating equipment in the new kitchen and dining hall at Buckie High School. The kitchen (right), serviced with a 4 in. diameter pipe and a 3,000 cu.ft. per hour Glover dry meter, is equipped for 1,000 meals a day. The dining hall seats 500, but provision is made for another hall of similar size. At present 650 meals are being cooked each day, but it is expected to reach capacity production quite soon. The photograph on the left shows the dining hall, which is heated by 12 Bratt Colbran overhead radiant heaters. The present consumption of gas is 4,000 cu.ft. per day, which is a good consumption for a small works like Buckie. Great satisfaction with the service has been expressed to the Engineer and Manager of the Gas Company, Mr. G. R. Rushton, by the cook superintendent.

CENTENARY OF THE SOUTHAMPTON UNDERTAKING

A CELEBRATION LUNCHEON

THE Southampton Gaslight and Coke Company has attained its Centenary this year. In celebration of the occasion the Company has issued an illustrated history of the undertaking, and on July 27 the Chairman and Directors entertained over 170 guests at luncheon at the Polygon Hotel, Southampton. The gathering included Mr. A. E. Sylvester, Chairman-Designate of the Gas Council, and many leading representatives of the gas industry, the Ministry of Fuel and Power, the contracting side of the industry, the commercial and professional interests of the town, and members and officials of many of the local authorities in the Company's area of supply.

Mr. **F. Woolley, J.P.**, a Director of the Company and a former Mayor of Southampton, proposed the toast of "The Local Authorities," who, he said, were of immense importance in our national life. They were the handmaidens of Parliament and they had little opportunity of expanding themselves on their own account, except in certain restricted directions. Nevertheless, their work was arduous and extensive, and in the very nature of things they were much more in touch with the life and affairs of the people than Parliament could ever be. If local authorities were asked what they thought about proposed legislation he believed it might become more in accordance with the wishes of the people than was sometimes the case at present. They could not hope always to please everybody, but they sought to serve the interests of the majority in their decisions affecting the public in their own homes. The gas industry also touched the people in their homes, as also did its sister service, electricity, for both of which they had very great respect. The Southampton Gaslight and Coke Company had provided its public utility now for 100 years, and it had not made a bad job of it. In recent times, and particularly in the last 25 years, it had developed on lines which could properly be described as thoroughly up to date.



The Centenary luncheon party at the Polygon Hotel, Southamp ton, on July 27, presided over by Brigadier E. M. Jack, Chairman of the Directors.

Friendly Local Authorities

The co-operation and friendliness of the local authorities was greatly appreciated. Their attitude towards the Gas Company and its operations had at all times been of the most helpful character. He was especially glad to notice among the guests their old friend Mr. W. G. Turner, Manager of what used to be the Electricity Department, now a part of the British Electricity Authority, whom they held in high regard.

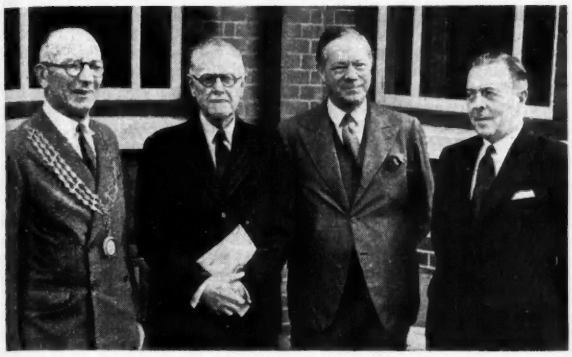
Councillor **F. Dibben,** Mayor of Southampton, responding to the toast, said he wished on behalf of the local authorities to pay tribute to the Gas Company. For 100 years it had played a great part in the provision of an amenity which had kept pace with the other social advances of the town and district. Its service had been adequate to their needs; it had been superlative in its value to the community. He was glad that Mr. Woolley had paid a tribute to the local authorities which, in his view, were among the finest features of democratic government in this country and perhaps in the world. Their members were in daily contact with the people who elected them, and with the common life of the people, and, perhaps more than any other democratic institution, they were able to perform their functions to the benefit of the community because they were part of the common life of the people.

He had been struck by the amazing service rendered by members of the local authorities; their unselfish, disinterested community service was a never ending source of amazement to him, and he hoped that they would long continue to give them their support and confidence. He had no fear that bureaucracy would encroach too far on their liberties, for he believed that nothing could take the place of the form of democratic government we enjoyed to-day. Many of the officers of the local authorities were among the guests, and to these he wished to pay a special tribute for they were the real sinews of local government, and the members of the local authorities would be among the first to acknowledge that they were particularly well served.

"Strong Rumours"

Mr. **A. E. Sylvester,** Chairman-Designate of the Gas Council, proposed the toast of "The Southampton Gaslight and Coke Company" and said how grateful he was for the opportunity to participate in their Centenary celebration. The duty and privilege of proposing the toast placed him in somewhat of a dilemma in view of the general circumstances that prevailed at the moment. He was sure no-one would expect him to divulge any secrets on that occasion. It was no secret that there were strong rumours that the gas industry was likely to be nationlized. He could tell them that there were such rumours,

and that they appeared to be very well founded. That being the case it was quite a problem to propose such a toast, because generally speaking it involved wishing the recipient long life and happiness, and in the circumstances he could scarcely do that sensibly and straightforwardly without being ironic. It was quite probable that within a short space of time the score sheet would read " Southampton Gas



Principal speakers at the luncheon : The Mayor of Southampton, the Chairman of the Southampton Gaslight and Coke Company, Mr. A. E. Sylvester (Chairman designate of the Gas Council), and Mr. S. E. Whitehead (Managing Director of the Company).

Company, bowled Gaitskell, 100." No matter what the future might hold in store that was a score of which they might well feel proud.

He had read with the greatest pleasure the Centenary brochure issued by the Company. A hundred years was a long time, but the history of the Company as presented in the booklet was so short and so modest that he had found it very impressive indeed. The record was beautifully written and the illustrations were very good. The brochure opened with a page of photographs, and he was impressed with the good looking lot of men who directed the Company's affairs. The Southampton Gas Company was very fortunate in having such a good looking body of men at its head. It was said that the face showed the character, and looking at the photographs it was not surprising to learn that the Company was in all respects a happy ship—a fact which he thought would be echoed by all the people employed in it.

Many things had happened in the 100 years' history of the Company, and although it was pleasant to look forward there were occasions, and this was one of them, when it was good to look back.

A Wonderful Stand

He had been particularly impressed with the story of the Company's experiences during the late war and the absolutely wonderful stand the Company made against all that Hitler could throw against it. If he might borrow some famous words he would say that that was the Company's finest hour, and nothing that happened in the future could take away the Company's glorious past, when with a minimum of interruption in supply it continued to carry on. The war years were undoubtedly the greatest years in its history, and no-one could ever take that record away. He found in that part of the brochure the answer to his problem as to what he ought to say on such an occasion. The great courage and high sense of devotion to duty which had animated the Company up to the present time were things that were timeless and could not be changed by any change in circumstance or organization. They were the permanent things that really mattered, and with such things in mind he could propose the toast sincerely and straightforwardly, and without any sense of reservation. Among the photographs to which he had referred there was first of all that of Brigadier Jack, Chairman of the Company, whose name he had the honour to couple with the toast. The Company had been very lucky indeed to have had such a Chairman in recent years. Another face, and one which he had come to know rather better than that of the Chairman, was that of Mr. Whitehead, Managing Director of the Company, whom he had had the pleasure of meeting more frequently and therefore knew well. However popular and well respected he was in Southampton, he could assure his friends that he had become a national figure in the gas industry. He was highly respected on all hands, and his reputation in the industry was very high indeed. He was also regarded with real affection by everyone who knew him.

Brigadier **E. M. Jack,** C.B., C.M.G., D.S.O., D.L., Chairman of the Company, replying to the toast, said the Centenary booklet had been ably written by Mr. Whitehead and produced by another of their Directors, Mr. H. W. Warren. Mr. Sylvester had referred to one matter to which he also wished to make reference—the work achieved by the Company during the war. They had a very difficult time. Some companies might have suffered as much as Southampton did, but not many suffered more. They had 57 raids, three of them very prolonged, lasting six or seven hours, and one highly concentrated raid on the works, of which some of the photographs reproduced in the booklet were striking evidence.

Inspiring Leadership

He wished to pay tribute to the way in which, after those various raids, the services were restored, sometimes in circumstances of very great difficulty, in a remarkably short space of time. Such results were due firstly to the inspiring leadership of the Managing Director, Mr. Whitehead, and secondly to the most able and devoted work of their Engineer, Mr. G. Neil, and his Assistants, and their Distribution Engineer; and last, but by no means least, to the devotion to duty and hard work, and the gallantry, of the Company's employees of all ranks and departments. He was glad to have this opportunity of paying tribute in public to those who did such fine work.

He wished also to refer to the happy relationships between the management and the employees which had existed throughout the history of the Company. It was true, as Mr. Sylvester had said, that they were a happy ship. Throughout the 100 years their relationships had remained friendly and formed a record of which the Company was justly proud. It was difficult to contemplate the past and also to think of the future, but so far as could be foreseen, and in the light of the rumours which Mr. Sylvester had said were prevalent, it seemed likely that before many more months had passed the gas industry would enter upon a new phase of existence. The Company would continue its work, though perhaps under a different form of direction. It would seek to carry on its work in exactly the same way as in the past and to achieve the same service. So far as he was concerned, when the change came he would no longer have any personal connexion with the Company, with which he had been proud to be associated for so long.

The Guests

Mr. S. E. Whitehead, Managing Director, submitted the toast of " The Guests " and expressed the Company's pleasure at being surrounded by such a large and distinguished gathering of friends. He endorsed what had been said about the local authorities, and particularly the Mayor's remarks about the officials of the local authorities, with whom he had had friendly and frequent contact. He was glad to acknowledge the happy relations existing between the technical and administrative officials of the local authorities and the Company. Among the official gas guests they were especially glad to welcome Mr. Sylvester, who had been retrieved from his short retirement to undertake new and important responsibilities at the head of the industry. He welcomed also Mr. J. S. Smith (Gas Section, Ministry of Fuel and Power), and regretted that Mr. R. Kelf Cohen had been unable to come; Mr. C. B. Felton, Regional Gas Officer; Dr. W. T. K. Braunholtz and Mr. John Terrace, Secretary and Hon. Secretary respectively of the Institution of Gas Engineers; Mr. L. P. Ingram, President of the Southern Association of Gas Engineers and Managers; Mr. J. R. W. Alexander, General Manager of the British Gas Council; Dr. A. B. Badger, General Manager of the Federation of Gas Employers; Mr. Frank H. Jones, President of the South Metropolitan Gas Company and Chairman of the Wandsworth and other Gas Companies; Mr. Michael Milne-Watson, Governor and Managing Director of the Gas Light and Coke Company; and representatives of many other gas companies. It was a great sorrow to them all that Mr. P. G. G. Moon had died in the past few days, and he would be sadly missed from their midst.

Among other guests Mr. Whitehead also referred to many represen-

A special window display staged during Centenary Week in the Southampton Gaslight and Coke Company's main showroom. The black object on the left is one of James Sharp's original cookers made 100 years ago by a Southampton firm, Lankester & Sons, Ltd., who are still flourishing in the town. The script, in blue, on the extreme left panel, reads : " Southampton's Link with the Introduction of Gas Cooking. One Hundred and Ten Years Ago the Inventor of Gas Cooking, Mr. James Sharp, demonstrated its use in Southampton. Ten Years Later Mr. Sharp became Engineer to the Southampton Gaslight & Coke Co. This Cooker was constructed by Messrs. Lankester & Son, of Southampton, to Mr. Sharp's design, One Hundred Years Ago."

tatives of firms who designed and manufactured the gas industry's plant and appliances, among whom he mentioned Mr. H. S. Cheetham, Chairman of the Society of British Gas Industries. Others included coal suppliers and factors who had given them good service during difficult times, tar distillers, coke distributors, trade unions, with whom they were on good terms; and the gas Press. Among non-gas guests were representatives of the commercial and professional life of the town and district, the railway and docks, hospitals, university, and the local Press. The Company was very fortunate in being served by a first class body of workers, and besides the senior officials, those present included the elected members of the Welfare Committee and representative pensioners. Fourteen men on the retired list had more than 48 years' service, and nine of them were present, with an average of 50 years' service.

Mr. **C. H. Chester,** Senior Vice-President of the Institution of Gas Engineers, in reply to the toast, conveyed the greetings of the President, Mr. E. Crowther, who regretted that he could not make the journey from Newcastle for the occasion, and congratulated the Company on its 100 years of absolutely unselfish service. He paid special tribute to Mr. Whitehead and enumerated some of the many ways in which he had served the industry over the past 25 years.

Mr. **R. P. Biddle,** Docks and Marine Engineer, also replied to the toast and testified to the good relations existing between the public services of the town.

Points from the Centenary Booklet

The Southampton Gaslight and Coke Company was incorporated by Act of Parliament in 1848, taking over a supply started in 1819 by the brothers Barlow. Although in those early days and for some time later the emphasis was upon lighting, a demonstration of cooking by gas was given in Southampton in 1837 by Mr. James Sharp, who was, as far as can be ascertained, the inventor of the gas cooker. Ten years later Mr. Sharp became Engineer to the Southampton Company, and one of his original cookers is still in the Company's possession. One hundred years ago the supply of gas was limited to the town of Southampton, but the Act of 1848 was followed by further Acts and Orders, with the result that the Company's area of supply now covers 188 square miles, and extends from Lyndhurst, Cadnam, and Fawley in the New Forest district, to Botley and Hamble on the east, and for some miles beyond Winchester on the north. The most notable of these enactments was that authorizing the acquisition of the gas undertaking of the Winchester Water and Gas Company. Winchester Corporation commenced operations in 1855 and was incorporated by Act of Parliament in the year 1865. It first occupied a site in Staple Gardens, moving to new works at Winnall in 1905.

From the earliest date for which records are available, steady and satisfactory progress had been made. The quantity of gas sold has trebled in the last 30 years and more than doubled since 1930. The amount sold in 1947 was 3,107,995 cu.ft., consumers numbered 76,795, main mileage was 606, and the number of employees 1,036.

A big advantage which the Company has enjoyed throughout is the facility with which seaborne Durham coal can be received at the works. On the other hand, certain difficulties have been encountered, the principal ones being a relatively high capital expenditure incurred many years ago, the congested condition of the works, and distribution problems arising from the shape and size of the district of supply, and the existence of rivers in the Southampton area and long stretches of forest land in the outlying districts. The first problem was successfully tacked by successive managements, and capital charges have been steadily reduced up to the present time. The last difficulty —distribution problems—was met largely by the use of high-pressure gas, of which one of the earliest installations in the country was adopted for the supply areas in the New Forest and also in the eastern parts of the Company's area.

During the past war, 57 raids were experienced on Southampton, and in these the Company suffered more than its share of damage, the Southampton Works being put out of action on three separate occasions. The severest damage experience by the Company was during a concentrated daylight raid on the Sotuampton Works on Sept. 26, 1940, when, out of 50 heavy high-explosive bombs dropped in the vicinity, no less than 27 fell on approximately one-half of the works, destroying carbonizing and water gas plant, one gasholder, purifiers, power house, and many other portions of the plant. There were 27 casualties among the employees, of which 11 were fatal. In this and other raids a large proportion of the Company's property was destroyed or damaged, including the total loss of the main showrooms, one branch showroom, and the distribution offices, and altogether nearly 300 mains were broken and over 5,000 services destroyed.

The Works To-Day

The Southampton Works has a total productive capacity of 11½ mill. cu.ft. per diem and the whole of plant, including stores, distribution shops, and garages, occupies a site of only 15½ acres. This results in serious congestion, in addition to which the site is split by roads and sidings into five separate plots. These disadvantages have been countered as far as possible by the introduction of vertical carbonizing plant, the extended use of belt conveyors, the raising of purifiers above ground level, and in other ways. Rail communication exists for the delivery and despatch of materials, but practically all the coal carbonized is seaborne, arriving alongside the Company's wharf in colliers carrying up to 2,200 tons, whence it is handled by two 4½ ton electric cranes and belt conveyors direct into retort house bunkers and coal stores. Facilities are also provided for loading coal from colliers into rail trucks or lorries for Winchester or other works. The small quantity of railborne coal received is discharged by a 20 ton wagon tippler on to the same belt system.

The carbonizing plant consists of 19 beds of eight horizontal retorts with Fiddes-Aldridge stoking machines, 24 Woodall-Duckham intermittent vertical chambers, and two installations of static vertical retorts, 20 retorts in each, also by Woodall-Duckham. The carburetted water gas plant comprises five hand-operated sets, one of 1½ mill. cu.ft. and one of 1 mill. cu.ft. daily capacity, with three old small sets which are shortly to be discarded.

The ancillary plant for coal gas is divided into two streams. The first, installed in 1925, contains Bryan Donkin exhausters, Livesey washers and rotary scrubber, while the second section, recently added, consists of duplicate Connersville exhausters, electrostatic detarrer, and multifilm washers. Both sections are equipped with Holmes super-type condensers.

Storage plant at the works includes, besides a number of small holders of old design, a two-lift column-guided gasholder of 2 mill. cu.ft. capacity erected in 1902, and a 3½ mill. cu.ft. four-lift spirally-guided gasholder erected by R. & J. Dempster, Ltd., and put into operation in 1934.

The Winnall Gas-Works, Winchester, has a capacity of 1½ mill. cu.ft. per diem and is much more favourably situated with regard to ground space. The manufacturing plant comprises 10 beds of six horizontal retorts with Drakes stoking machinery and two water gas plants, one of which is equipped for carburetting.

Offices and Showrooms

The Company's central offices at 66, Above Bar, having, some 10 years ago, become inadequate, a favourable offer to purchase was accepted and a new site procured a little to the north. A large shop with a frontage of 70 ft. at 166-174, Above Bar, was reconstructed and converted into modern showrooms with demonstration rooms and offices above. At the rear of this buildings and abutting on the parks a new four-storey office building was constructed, and the premises were occupied in 1939, being officially opened on June 29 of that year by Lady Bencraft. The offices suffered minor damage during the war, but the showroom block was completely destroyed by incendiary bombs in November, 1940. After considerable delay and the refusal of all applications to rebuild, the site has recently been used for the erection of three temporary shops, one of which is now the Company's central showroom. The distribution offices and fittings department had also to be vacated owing to enemy action and are now housed in the Victoria Rooms, Portland Terrace, in premises formerly occupied by the Company's Social and Athletic Club.

Sales

In the year 1932 an intensive sales programme was instituted with two main principles in view—first, that only appliances of approved efficiency should be offered for sale, and secondly that, the Company's main object being to sell gas, the margin of profit on the sale of appliances should be reduced to a minimum. That this policy, aided by increased sales staff, cooking demonstrations, and local publicity, has proved effective is shown by the following figures relating to appliances sold: 1932, £22,660; 1933, £55,946; 1934, £80,932; 1935, £81,810; 1936, £83,093; 1937, £94,969; 1938, £96,164.

The increase in price during the years named, the emphasis placed on the higher grade appliances, and the receipt of orders for some large commercial installations, contributed to the above increasing value, and a more realistic picture is given by the number of appliances sold in the same years. These are as follows: Cookers, 1932, 1,262; 1938, 5887. Water heaters, 1932, 689; 1938, 2,457. Wash boilers, 1932, 1229; 1938, 1,967. Fires and radiators, 1932, 1,940; 1938, 2,238. Totals, 1932 5,120; 1938 12,549.

Geographical considerations and the excellent facilities for the intake of coal and despatch of coke emphasize the future importance of the Southampton Works as a major unit in any scheme of integration, whether under nationalization or otherwise, and it appears possible that additional land will be available as the result of enemy action and town planning. At present a new carburetted water gas plant of 5 mill. cu.ft. per day capacity and a duplication of the 1938 section of purifiers are nearing completion. New exhausters, compressing, and boosting plant are also being installed. The next steps will be additional carbonizing plant, coke screening and storage, and holder capacity.

The East Midland Division of the Coal Board have informed the Chesterfield Gas Committee that the National Coal Board had approved their scheme for additional supplies of coke oven gas to Chesterfield both on a short and long term basis. The Ministry of Fuel and Power has asked the Chesterfield Corporation to defer for the time being their scheme for the erection of a new 2 mill. cu.ft. gasholder at West Bars until a new holder of a similar capacity at Whittington is completed, so that its effect on local storage could be ascertained. The Council, it is understood, however, will be urged to press the Ministry for an immediate decision, because the storage at West Bars is considered by the Committee to be necessary.

INAUGURATION OF NEW METER WORKS

GAS engineers and other representatives of gas undertakings of Lancashire, Yorkshire, and Cheshire attended the opening of the new works of Vanda Meters, Ltd., at Barkerhouse Road, Nelson, on July 22, where they were welcomed by the Chairman of the Company, Mr. J. Miller Thomson, Chairman of Messrs. Alder and Mackay, Ltd., of which Vanda Meters is a subsidiary, Mr. Harold E. Bennet and Mr. J. B. Clay, Managing Directors, Mr. Stanley Bennet, and Mr. J. L. Bennet.

The Mayor of Nelson, Councillor **Rushton, J.P.**, in formally opening the works, referred to the fact that a new and welcome industry was now installing itself in the town. He sincerely hoped that it would prosper exceedingly, and that its Directors would be glad in future years they had sought a site for their works within the area. It was pleasant to learn that there was an excellent spirit of co-operation between the management, their clerical staff, and their workpeople. The preparations for the new works had begun at Easter, 1948, and ample provision had been allowed for considerable extensions. Eventually the works would occupy a site area of 2½ acres, and at present there were about 65 employees, of both sexes, in full employment. The firm would be engaged upon the manufacture of both industrial and domestic meters, from the sheet metal stage to the finished article.

In the entrance hall of the new Vanda Meter Works, Nelson. Left to right: J. Miller Thomson (Chairman of the Company), Councillor Rushton, J.P. (Mayor of Nelson), J. W. MacLusky (Halifax, President of the Manchester District Association of Gas Engineers), Councillor Tattersall (Southport), H. E. Bennet (Joint Managing Director, Vanda Meters, Ltd.), S. H. Packer (Manchester), A. F. West (Altrincham), R. Walker (Manchester), W. E. Fishwick, J. L. Bennet (Director), J. B. James (Preston), S. Milliken (York, Harrogate Group), S. Bennet (Director), J. Graham (Lancaster), Henshall (Manchester), and J. B. Clay (Joint Managing Director, Vanda Meters).

Subsequently the party were entertained at luncheon at the Nelson Hotel, Nelson.

The **Chairman** (Mr. J. Miller Thomson), in proposing the toast of "The Mayor and Town Council of Nelson," said he had been anxious to propose the toast because the Company gratefully desired to acknowledge the willing assistance it had received not only from the Mayor and the Borough but also from many others in the setting-up of the new undertaking. They were also indebted to Mr. J. B. Clay for the energy and initiative he had displayed in furthering the good work. He felt, also, it was incumbent upon him to refer to the efficient service on the part of the contractors, Messrs. Russell Bros. It was gratifying to find that the Company, its Directorate and staff, had not been regarded by the community of Nelson as outsiders, and that their entry into the district had been most heartily welcomed as bringing a new industry to the locality. The Company was initiated, in the first place, at Brierfield just outside Nelson, and it had developed to such an extent that it was now found necessary to provide a site for much larger operations under the direction of Mr. J. Derbyshire, as General Manager. He hoped that the Mayor would convey the thanks of the Company to his Council for all the assistance they had rendered. He took the opportunity of presenting to the Mayor a pocket book as a small memento of the opening ceremony.

The **Mayor of Nelson,** responding to the toast, said that Vanda Meters, Ltd., would certainly find that there was a really wonderful communal spirit prevailing in Nelson. The Chairman had mentioned upon the latter to keep them in their midst. It was sincerely to be hoped that in the near future plans would be submitted to the authorities at the Town Hall for much larger accommodation than the Company had prepared for at the moment. Nelson needed new industries, and there was every desire to avoid the occurrence of anything in the nature of a slump in the area. The more new enterprises were introduced the less likely would be such an eventuality.

Mr. **H. E. Bennet** proposed the toast of the "Gas Industry." Except for the war period of 1914-1918 he had worked for the gas industry all his life as did both his father and his grandfather before him, as well as all his brothers. They had all enjoyed doing so, and it was hoped that all members of the family would continue in its service. He had to couple with the toast the name of Mr. James MacLusky, President of the Manchester District Association of Gas Engineers, and Engineer and Manager of the Halifax Gas Department. When he (Mr. Bennet), as a young demobbed officer, went to Northern England as a representative of Messrs. Alder and Mackay, Ltd., he visited the offices of the Halifax Gas Department. There he met that the firm had moved from Brierfield to Nelson, and it now devolved the late Mr. W. B. McLusky. It was then his pleasure to receive an order for meters to be supplied to the Halifax Gas Undertaking which he duly transmitted to his firm. In future, whether it would be under new management or otherwise, the gas industry would remain the gas industry. Although it was now nearly 150 years old it was stronger and more virile than ever before.

Mr. **James MacLusky** thanked Mr. Bennet for his reference to his late father, Mr. W. B. McLusky. Mr. Bennet was proud of the fact that his family had been associated with the gas industry for so many generations, and he, too, was equally proud of the fact that his own people had been connected with it for very many years. By looking back to the past, and looking forward to the future, they could all learn something useful for the present. The gas industry had gripped the consciousness and firmly enlisted the energies of all its servants. They had become inspired by their work, and their ambition was to be able to utilize the nation's fuel resources to the very utmost by the production of a smokeless commodity. Theirs was a vocation and not merely a job. That day they had visited Nelson with a view to acquainting themselves further with one of the branches of the industry —namely, the production of meters coupled with their maintenance. At the new works of Vanda Meters, Ltd., they had seen how a reliable instrument could be manufactured, and also of a smaller type than those of other days. At the present time the gas industry had to deal with appliances for boiling water instantaneously which had a relatively high consumption of gas per hour. This factor, of necessity, demanded a larger meter, but there was also a great demand for a smaller appliance requiring less space in a considerable number of modern dwellings. Vanda Meters, Ltd., were responding admirably to the new requirement. During their visit they had seen something which was well worth inspecting, and the town of Nelson was to be heartily congratulated upon having such a fine works established in its midst.

Mr. **Stanley Bennet** then moved that a hearty vote of thanks be accorded to the Chairman for his conduct of the proceedings. Mr. Miller Thomson, he said, was a distinguished W.S. and legal practitioner in the City of Edinburgh. He had provided the Company with a rare combination of far-sightedness, historical fact, encouragement, and optimism. He had told Vanda Meters, Ltd., to get going and keep going. There was no doubt that full progress would be made under the guidance of Mr. W. E. Fishwick, Mr. J. Derbyshire, Mr. J. B. Clay, and Miss M. Feather.

The **Chairman**, in responding to the vote of thanks, said that in following the father and grandfather of Mr. Bennet, and, since his own appointment as Chairman of Alder and Mackay in 1923, his association with that Company had been a very happy one. He would like Mr. Derbyshire and Mr. Fishwick to say a few words.

Mr. **Derbyshire** said there was one point he would like to mention which was certainly very much appreciated by both Mr. Fishwick and himself. Vanda Meters, Ltd., had attained its present commercial stature largely through the wonderful assistance it had received from Alder and Mackay, Ltd. He was confidently looking forward to a time of further definite progress. The men who were working under his direction would do their utmost to give the gas industry a good product, and the Company had now attained a very high commercial status.

Mr. **Fishwick** also remarked that the Company could not have attained its present position without the assistance of Messrs. Alder and Mackay, Ltd., who had fulfilled every one of the promises they had made to place it upon a secure foundation. Every one of the ideals they had set out to achieve had now been realized. The employees were evincing a wonderful team spirit and responded to the calls that were made upon them with the utmost willingness. It was a recognized aim of the Company that quality of product must come first.

Mr. **A. F. West** (Altrincham), on behalf of the visitors, warmly thanked Vanda Meters, Ltd., for their hospitality. They were well aware that Alder and Mackay, Ltd., were an old-established firm who had rendered yeoman service to the gas industry for, at any rate, the past 100 years. With their backing, Vanda Meters could go ahead with every confidence of prosperity in the future.

PARLIAMENTARY NOTES

ON July 7 the Minister of Health replied to a question by the Member for Eye, who had asked the Minister of Works if he would consider the suggestion that solid fuel cooker and other similar appliances should be quantity produced and installed in new houses being built by local authorities ; he asked, in addition, if he would consider making these installations part of the housing subsidy. Mr. Bevan said that arrangements had been made for an increased production, and where local authorities proposed to use solid fuel cookers they were given every encouragement to install the modern type in new houses. With regard to the last part of the question, the housing subsidy, he stated, was paid in respect of the whole house and not for particular installations.

Industrial Electricity Load

On July 8 the Member for Hulme asked the Minister of Labour if he would make a statement about the arrangements for spreading the industrial load next winter. Mr. Isaacs said that the whole matter had had consideration and that it was perfectly clear that steps would have to be taken to reduce the load on the power stations next winter, during the peak periods in the morning and the evening.

The Electricity Sub-Committee of the National Joint Advisory Council had recommended that during the months of December, January, and February industry should be asked to reduce its peak load by 20% during the peak hours between 8 a.m. and 12 noon, and 4 p.m. and 5.30 p.m. As with last winter, the arrangements to achieve that economy would have to be worked out by the regional boards for industry and their district, town and other local committees with the firms concerned. With regard to the months of October, November, and December the problem was not uniform over the whole country so the matter could be left to the regional boards for industry who would make any arrangements that they considered necessary. The Government had accepted the recommendations of the Sub-Committee and were asking the regional boards for industry to make the necessary arrangements; the Government was confident that industry would show the spirit of co-operation, and had accepted a recommendation that there should be powers available to secure the observance by firms of their obligation to reduce their load by spreading, or other means, when requested to do so. Mr. Isaacs added that it was not enough to make these arrangements for industry only; other classes of consumer must also make a contribution. As announced by the Minister of Fuel and Power, commercial consumers, including shops, offices, warehouses, hotels, and cinemas would come within the scope of the system and would have to reduce their consumption by 20% also. The methods of controlling the demand, he said, by non-industrial consumers had been investigated by a committee under the chairmanship of Sir Andrew Clow and its report would be issued in the near future. Mr. Isaacs emphasized that it was essential for domestic consumers to play their part in the matter of economy; only by combined effort would the problem be overcome.

Civic Restaurants

The Member for Fife, Western, asked the Minister of Food on July 12 if he would give the number of civic restaurants that had been opened during the past year; the number closed by local authorities during the same period; and what steps he was taking to help authorities to open up these restaurants. Dr. Edith Summerskill, replying, said that she could not give the exact information but 1,098 civic restaurants were operating on March 29, 1947, and 773 on Jan. 3, 1948. Her Department, she added, and the Ministry of Health were both eager to open such restaurants, but the initiative must lie with the local authorites. The Member for Croydon, North, asked if the reason for the closing of so many restaurants in the period was due to high rates; to which Dr. Summerskill replied, no; she could not agree that that was always the case.

Fish and Chip Shops

The Member for Aston asked the Minister of Food how many fish and chip shops there were in Burton-on-Trent and Birmingham, respectively; and what proportion of the total population of each town was served by each shop. In Burton there are 36 such shops, and 460 in Birmingham; the number of people served by each shop is 1,366 in the former, and 2,387 in Birmingham. After Dr. Summerskill had given that information, the Member asked why she consistently refused to grant applications for licences for new fish and chip shops in Birmingham. Dr. Summerskill then pointed out that during the last five years 74 licences for fish and chip shops had been given for Birmingham as against one for Burton-on-Trent.

Statistical Digest

The Member for Glasgow, Central, asked the Minister of Fue and Power when he proposed to publish a further Coal Production Statistical Digest as was published for the year to December, 1945. Mr. Robens replying, said that the Ministry's Statistical Digest for 1946 and 1947 was with the printer.

Refrigerators

On July 19 the Member for Middlesbrough asked the Minister of Supply why we were exporting refrigerators at an average conversion rate of £355 per ton and the Trade and Navigation returns showed that we were importing refrigerators at £737 per ton, amounting to £130,000 worth of refrigerators in the first four months of this year. Would the Minister look into this with a view to permitting British manufacturers to supply the home market, and then export their surplus, so saving dollars. Mr. Strauss pointed out that licences for complete domestic refrigerators were granted only for limited quantities, and for samples used as prototypes for manufacture in this country. Imports consisted mainly of certain parts not made in this country, and of spare parts. These, he said, were of much greater value per ton of steel than the complete refrigerator.

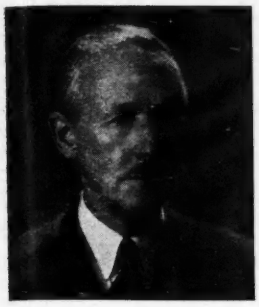
The same Member then pointed out that once it was baths, then typewriters, and now refrigerators which were being allowed into this country at prices far in excess of those we were getting for our exports. If this situation went on would we ever be able to close the import-export gap ?

Mr. Strauss then said that no complete refrigerators were imported in the first four months of this year; only spare parts for existing refrigerators were allowed in.

Another Member asked if our manufacturers were charging enough for their exported refrigerators, and Mr. Strauss replied to say that they were charging as much as the market would bear.

Fuel Consumption (Restrictions)

On July 15 the Member for Leyton asked the Minister of Fuel and Power to what extent the contemplated restrictions on winter fuel consumption would be applied to domestic consumers and hospitals. The Minister, in a written reply, said that supplies of coal, coke, &c., to householders and hospitals would continue to be regulated by the Coal Distribution Order, 1943. He was, he wrote, lifting the restrictions on the supply of inferior grades of coal, and although there were no strictures on the use of gas and electricity by householders and hospitals, both should make all possible economies in the consumption of electricity.



BRITISH GAS-MAKING COALS

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APPRECIATION of the position of the supply of gas-making coals in Great Britain requires not only a complete knowledge of the properties of British coals in each coalfield, but also an assessment of the quantities of suitable coal which are likely to be available over a reasonable length of time. Since the main centres of gas supply are in areas of dense population, and not necessarily in the coalfields, and transport charges can form a high proportion of the cost of coal, the geographical distribution of the gas-making coals is an important factor. Gas-making coals may be drawn from a wide range, but within this range, depending on ash content and size, the coals vary in suitability for the two main types of carbonizing plant. The choice of plant in any construction programme should therefore be strongly influenced by the type of coal readily available. This paper attempts to define suitability mainly with reference to existing types of plant since it is probable that no major alterations to design will occur for a considerable period of time. It is realized, however, that the introduction of a new process, such as complete gasification, could make more reserves available by widening the range of suitability to include non-caking bituminous coals.

Fuel Research Rapid Survey of Reserves

The properties of British coals have been the subject of close study for many years and reliable data have been accumulated on a comprehensive scale. Quantitative figures for coal reserves have, however, been available only as overall quantities, and it has not been possible to assess, with any accuracy, the proportions of the different types of coal present. The survey of coal properties in the ground has been the work of the Coal Survey of the Department of Scientific and Industrial Research (now of the National Coal Board), and has progressed steadily since 1922. The majority of the reports of this survey work are detailed studies of seams, but certain of them give broader accounts of the coals of entire coalfields; generalized accounts of distribution and properties of British coals are available only in unofficial publications. The collected survey data now form an almost complete picture of the properties of the coals in all the main seams which have been in production.

It has now become possible to apply this information to the quantitative assessment of the reserves of coal of different types. When, in accordance with the Coal Act of 1938, the ownership of all unworked coal became vested in the Coal Commission on behalf of the nation, the compensation paid to existing owners was assessed for the Commission by Regional Valuation Boards. The coal which could reasonably be expected to be raised during the valuation period (commonly 100 years from July 1, 1942) was assessed from the amounts of coal remaining unworked in the seams under production, and in certain unworked areas whose development seemed probable within the valuation period. It did not include those reserves in areas of virgin ground, which were not likely to be developed within the valuation period.

Since the Boards were primarily concerned with the value of coal holdings rather than with the assessment of reserves, arrangements were made for the Fuel Research Survey officers to re-examine the records of the Board's work and to prepare a schedule for each colliery, showing the reserves planned to be raised from each seam during the valuation period. This was done in collaboration with the experts employed by the Regional Valuation Boards, completing, where necessary, a full 100 years' planned output for each seam over 24 in. in thickness and above a level of depth of 4,000 ft. To this schedule were added data relating to the ash, sulphur, and volatile matter contents, and the caking power of the coal, as the main criteria of the characteristics which determine industrial usage. In the case of Scotland, the necessary data were derived from the Scottish Home Department Report on the Scottish Coalfield.

This has made it possible to assess, in quality classes, the planned output of coal for the 100 year period 1942 to 2042, and some additional reserves at the year 2042. The total planned output amounts to 20,500 mill. tons of coal, or an average of 205 mill. tons per annum. The actual output must fluctuate about this average, depending upon demand, and higher outputs, up to an average of 238 mill. tons, are projected for the first decade. If this higher output is continued, the outputs in later years must fall below the average, or the planned output will be realized in a shorter period than 100 years. It might, therefore, be wise to consider the planned output as a unit of 20,500 mill. tons, leaving the duration of mining for the future to decide.

The transfer of all the data to a punched-card system will eventually make it possible to obtain a wide selection of technical information. This is being done, but in the meantime a preliminary Rapid Survey has been compiled of which full use has been made in preparing this paper. The Rapid Survey is not complete, and certain revisions may be necessary as information about individual seams accumulates. Moreover, the projected outputs and future developments were planned before the coal industry was nationalized, and it is possible that the National Coal Board may advocate departures from these plans. It is considered unlikely, however, that any such changes will markedly affect the general picture, and they are probably not significant in the present context.

In order to define quality, the Rapid Survey employs code numbers, originally used in another investigation, which involve caking power and volatile matter only. The former is defined in terms of the Gray King assay and the latter is calculated to dry-ash-free coal. Twenty types of coal are recognized. This sub-division does not form a comprehensive classification of British coals, but serves, when associated with the additional important factors of size grading and ash content, as a means of identification. The value of each type of coal for the different industrial purposes is then assessible from knowledge of the code number.

Before considering in detail the quantities of the coal types suitable for gas manufacture, it is important to note the possible change in the total rate of production of coal. In doing this the Rapid Survey has divided the coal into six classes, as shown in Table 1.

The table shows that there is a broad similarity in the outputs of the selected classes in 1938, in the planned average output, and in the projected higher outputs of the first decade. The outputs for 1944 are rather different, but this is no doubt attributable to the effects of war-time conditions. It would seem that present planning does not therefore, involve the working out of any of these classes at a rate likely to disturb the balance seriously during the latter end of the 100 year period. Beyond this period, Col. 8 shows marked changes in distribution, but the discussion of this is outside the scope of this paper; indeed, in industry as a whole, the prospect of reasonable continuity for about 100 years should be more than sufficient for the present-day planning of new plant. This is a satisfactory state of affairs in itself, but is not the whole story. A given industry will prefer to receive the coals with which it can reach its highest efficiency, while the National Coal Board will wish to meet such preferences as closely as possible. The present period of change and reconstruction would seem to provide an excellent opportunity for combined planning, in which the Industrial Coal Consumers' Council (Sir Ernest W. Smith, C.B.E., Chairman) will no doubt play an important part.

In Table 1 it should be understood that the output figures do not all relate to existing collieries. The planned outputs of most existing collieries will begin to decline after a period of about 30 years and will continue to decline until, in some fields, the outputs will be only 50% of the present level. The outputs from new collieries will not make good these losses, and the deficits will be made up by developing areas in which coal mining has not yet started. The new seams which will be started in the existing areas of production during the next 100 years will, in general, tend to be thinner, and the coal will be higher in ash content since the best and thickest seams will tend to be worked out first. In the virgin areas, however, the new seams are likely to be as thick as the older seams, and the coal of as high a quality. The tendency to higher ash content in existing areas will, no doubt, be offset by better methods of preparation, or by preferential distribution to those industries in which high-ash coals can be utilized with the least decrease of efficiency. Finally, besides the planned output of the next 20,500 mill. tons, additional reserves of a further 15,000 mill. tons (not the entire reserves) have been roughly classified, as shown in Col. 8 of Table 1. These show appreciable differences in class distribution when compared with the 1944 output, but it is impossible to say to-day whether the differences are of sufficient magnitude to be significant, even if industrial coal requirements remain the same.

Regional Survey Reports of the Ministry of Fuel and Power

In 1945, the Minister of Fuel and Power appointed Regional Survey Committees " to inquire into the present position and future prospects of the coalfields," a task which necessitated a review of the reserves of coal. The Committees included among their members colliery managers and mining engineers, who approached their task from the strictly practical standpoint of the future outputs likely to be obtained from the available reserves. They did not all adopt the same methods of assessment, so that the figures for individual coalfields are not strictly comparable. Nevertheless, it is important to record that the figures for coal reserves given in their reports are of the same order as those in the Rapid Survey Report. Some of the Committees took account of the different types of coal available, either in detail or in two categories described as " gas " and " non-gas." This procedure was not adopted by all, however, and though use has been made of the reports in preparing this paper, much greater use has been made of the Rapid Survey Report, in which the same classification by coal types was applied in all coalfields.

TABLE 1.—*Summary of Planned Output of Coal in Great Britain*

Classes of coal	Planned output: Total, 1942-2042 mill. tons	%	Annual, 1942-1952 mill. tons	%	Annual outputs (1) 1938 (2) 1944 mill. tons	%	Reserves beyond 2042 %
Anthracite (type 100)	704.6	3.4	8.239	3.5	(1) 6.071	2.7	6.8
					(2) 3.760	1.9	
Low- and medium-volatile steam coals (types 200, 300)	1,861.9	9.1	22.086	9.3	(1) 20.684	9.1	9.8
					(2) 14.315	7.4	
Medium-volatile coking coals (types 301, 401a)	1,556.2	7.6	22.229	9.3	(1) 20.723	9.1	8.5
					(2) 15.385	8.0	
High-volatile strongly caking and medium caking coals, *i.e.*, coking-gas and gas coals (types 400*, 500, 600)	7,402.3	36.1	88.016	37.0	(1) 83.992	36.8	29.5
					(2) 73.124	38.0	
High-volatile weakly caking coals (type 700)	2,894.4	14.1	33.513	14.0	(1) 34.176	15.0	10.8
					(2) 29.348	15.2	
High-volatile very weakly caking and non-caking coals (types 800, 900)	5,634.1	27.5	63.391	26.6	(1) 60.662	26.6	34.6
					(2) 56.928	29.5	
Unclassified	446.9	2.2	0.671	0.3	(1) 1.753	0.7	—
					(2) 0.021	—	
Total	20,500.4		238.145		(1) 228.061		
					(2) 192.881		

* Except 401a (Durham).

Coal Requirements in the Gas Industry

The above review presents a picture of the general position of coal output during the next 100 years, but with reference only to type of coal. A complete picture would require also the review of size grades and their ash contents and a closer definition of type. The purpose of this paper is to consider the future supply of coal for the gas industry, and it must be made quite clear that size grading and ash content are of considerable importance, even though type of coal may be the over-riding consideration.

From the Rapid Survey Report, the Regional Survey Reports, and the 1945 Statistical Digest of the Ministry of Fuel and Power, the author has endeavoured to present information relating to the present-day coal requirements of the gas industry, its future requirements, and the probability of their future fulfilment. In doing this he has been greatly helped by discussion with officers of the National Coal Board.

There are a number of variables which require close definition when considering the type of coal suitable for gas manufacture. While the gas industry remains a two-fuel industry, providing both coke and gas, the first requirements are that the coal should be high in volatile matter, that its caking power should lie within certain limits, and that its ash content should be low. There may even be a case for saying that the latter should be very low. Necessarily, however, the first consideration must be that of gas-making quality, and the second that of suitability for a specific type of gas-making plant.

An exact definition is given below of the choice made by the author, since there may be differences of opinion as to the lines of demarcation between types, and, with the data provided in the Rapid Survey, it would be readily possible to calculate the effect of an alternative choice. For the reasons given below it has been taken that " first-choice " gas coals are drawn from coal types 402, 501, 502, and 602, and " second-choice " coals from types 601 and 702.

Coal types 402 **and** 502 combine a high caking power, over coke-type G (caking power as defined in the Gray-King assay), with a high volatile matter in excess of 37%. Under static carbonizing conditions they promise a high gas yield with a strong coke. In continuous operation the caking power of type 402 is high if the highest coal throughputs are to be maintained and a sized grade is more accurately the first choice; a reasonable proportion of sized material in type 502 makes it " first-choice " coal. Type 402 is drawn mainly from Durham and Yorkshire. The Northumberland, Derbyshire, Lancashire, and North Staffordshire coalfields supply some 35% of type 502, the remainder being drawn from Durham and Yorkshire.

Coal type 501 includes coals within the fairly high caking power range of G_8 to G_8, but which contain less then 37% of volatile matter. They give a strong coke in static or continuous retorts, but tend to give lower gas yields from static charges. In graded form, or containing a reasonable proportion of graded material, they are considered " first-choice " coals for use in continuous vertical retorts. In order to ensure that the coals selected for gas manufacture are those nearest the upper limit of volatile matter, an arbitrary selection has been made of half the available coal of this type. The remaining half could be judged " second-choice " coal, but it is preferred to regard it as more suitable for coke manufacture. Of this coal type, 65% is drawn from Durham and Yorkshire, and the remainder from Northumberland, Lancashire, North Staffordshire, and South Wales.

Coal type 601 is similar to type 501, but with caking power in the range of G_4 to G_1. In order to include in the choice only those coals which are near the higher level of volatile matter, an arbitrary choice has been made of half the available coal and this has been deemed " second-choice " because it would produce a weak coke and a low gas yield from static retorts, but give a good performance in continuous retorts in graded form. Yorkshire supplies 70% of this type.

Coal type 602 is similar to type 601, but with a higher content of volatile matter (over 37%). Coal of this type is of particular value for continuous retorts, but only in graded form. The reserves are large and it is noteworthy that some 18% of the country's output is found in Northumberland and that it comprises the greater part of Scotland's gas coal.

Coal type 702 contains coals suitable, when in graded form, for continuous vertical retorts. It can be " first-choice " in certain areas (Scotland) where considerations of proximity are of first importance. An arbitrary choice of half is taken to represent coals closest to coke type G. Coal of this type is widely distributed—Northumberland providing 24, Yorkshire 24, Nottinghamshire and Derbyshire 20, Lancashire and Cheshire 15, and Scotland 10% of the country's output.

To summarize, the following review of available coal is therefore made upon the basis of the author's selection, as follows:
" First-choice ": Types 402, 502 and 602 and half 501.
" Second-choice ": Half each of types 601 and 702.

It must be emphasized once more that the choice is arbitrary, since there are many factors in the consideration of the effect of type and size of coal on the efficiency and economics of gas manufacture with which it would be impossible to deal in the compass of this paper. It was necessary, however, to make a generalization of this kind in order to find a basis on which to work. It may well be desirable later to recalculate the quantities at different quality levels. There is, however, another important reservation; the moisture content of coal is as much an impurity as ash and reduced gas yield *pro rata*. In assessing relative values of coal, it can be taken that the natural moistures of coal of types 402 to 702 vary from 1 to 2% to 8%; the effect of accidental water is another matter. A further important matter is that of coal blending. In static retorts the range of gas coals can be greatly extended when dealing with coals of types 402 and 502 by blending with coal of lower caking power, itself outside the range of " first " or " second " choice gas coal. In all blending work, blend constituents must have the same size grading; this is particularly important if blending of the larger size grades is attempted.

The coal industry has plans for improvements in the cleaning and grading of coal. It might well follow that repeatability of coal quality in not too many grades would influence the design of gas-making plant in the direction of continuous vertical retorts in one area, or static carbonizing plant in another. A first step towards standardization and limitation of coal size-grades is found in the Report of the British Colliery Owners' Research Association Committee, which recom-

mends a series of seven grades and tolerances for these grades. The grades relate to round-hole screens and are:

	In.
Large cobbles	6 to 3
Cobbles	4 to 2
Trebles	3 to 2
Doubles	2 to 1
Singles	1 to ½
Peas	½ to ¼
Grains	¼ to ⅛

" Large " coals are defined as " over *x* in. "; slacks are defined as " Smalls " with an attached figure giving the percentage below ½ in.; *e.g.*, " ½ in. 50". The National Coal Board has adopted this grading and is in process of putting it into practice. This is no small undertaking, but is being brought about systematically.

The Coalfields of Great Britain

In Great Britain coal-bearing strata occur in more than 40 detached areas which form parts of larger fields split by folding and denudation. In some cases the coal-bearing strata are " concealed " by later geological formations. The larger fields may be divided geographically into northern, central, and southern groups, in each of which a different structure and sequence of strata can be recognized.

In England and Wales the predominant types of coal are the high-volatile coals, which represent more than three-quarters of the planned output. Of the types chosen by the author for gas manufacture the following quantities (in millions of tons) are shown:

" First-choice "			" Second-choice "		
Coal type	Planned output 100 years	1942-52 average	Coal type	Planned output 100 years	1942-52 average
402	200	2.2	Half 601	283	3.5
Half 501	886	10.6	Half 702	1,143	12.0
502	1,237	14.5			
602	2,060	22.3			
	4,383	49.6		1,426	15.5

From the point of view of suitability of type alone, therefore, the planned output of coal, even of " first-choice," could greatly exceed the 18 mill. tons used in gas-works in England and Wales in 1945.

In Scotland, the predominant types of coal are the high-volatile coals of weak or low caking power with a relatively small proportion of medium-caking coal of type 602. The Rapid Survey has based its values for developed reserves of coal upon the Scottish Coalfields Report of 1944; the figures are, therefore, not strictly comparable with those for England and Wales—again in millions of tons:

" First-choice "			" Second-choice "		
Coal type	Planned output 100 years	1942-52 average	Coal type	Planned output 100 years	1942-52 average
602	205	3.03	702	142	1.72

The planned output of coal of " first-choice " does not leave a safe margin of supply for the 2.13 mill. tons (1945) of gas coal required in Scotland. In view of other industrial requirements for such coal, and the incidence of other factors (unsuitable size and ash content), even the total of " first " and " second " choice material does not represent a safe margin and makes Scotland an " importing " area for gas coal. During 1945 the " imports " had reached 220,000 tons.

The gas industry is not, however, the only customer for coal of the chosen types. Each area of production should, therefore, be considered separately in order to examine the requirements of gas coal from it, and to assess the effects of transport costs. It is obviously impossible to do this adequately at the present time; in the first place because complete data do not exist even for the conditions now obtaining, and, secondly, because the coal industry is passing through a period of reconstruction which must, in due time, make future supplies of coal available in improved forms and with greater regularity of properties.

The areas in question are the coalfields and the National Coal Board Marketing Areas. Many of the areas coincide (since they follow county boundaries) and the main difference in the outlines is the absence of a coal production area (save Kent) in the high-consumption areas of London and southern England.

As a first step in studying the problem, the different coalfields are discussed below with special reference to the reserves and planned rate of production of the chosen types of gas coal.

Northumberland and Durham

This coalfield is geologically one unit, in which the coal seams do not vary rapidly in properties, but show a slow transition from north to south, from high-oxygen weakly caking coals to low-oxygen highly caking coals. The life of the collieries on the basis of the planned output shows an increase from west to east—*i.e.*, from the direction of the outcrop towards the under-sea areas—but in general the output of all types of coal will be fully maintained for the 100 year period with the exception of the low-volatile coking coals of West Durham, which are expected to be exhausted in less than 50 years' time.

In the Northumberland coalfield, the estimated reserves in proved seams are 1,760 mill. tons, and it is expected that the annual output will increase from 11.5 in 1945 to 14.8 in 1950 and 15.3 in 1960, and then slowly decrease. The appearance of marked caking power in the coal occurs some distance north of the Tyne, so that a fair proportion of Northumberland coal is suitable for gas manufacture and even for making metallurgical coke. Coal of this type is more suitable in sized form for continuous vertical retorts than in the form of smalls for static carbonizing plant, but it seems probable that, out of the 4.9 or 5.9 mill. tons per annum of gas coal planned much more could be made available in the form of clean graded coal than the 0.47 mill. tons distributed in 1945, only one-fifth of which was graded coal. Coal of this type would be very acceptable in the London areas or on the South Coast.

In the Durham field, which produces only coking, gas, and coking-gas coals, the output of high-volatile coals is of special interest to the gas industry, despite the fact that the coal is invariably friable, and run-of-mine coal may contain over 50% of material passing a ½ in. screen. Since the best gas coals come from the eastern part of the field, their planned output will be fully maintained. Coal of this friability is more suitable for carbonization in static charges, but if screened at the point of use the larger material gives a good performance in continuous vertical retorts, the smalls being available for static retorts. Of the annual output of 24.3 mill. tons planned for Durham during the next 100 years, 7.6 are " first-choice," and 0.1 " second-choice," gas coals, and the gas industry received a high proportion of this (6.02 mill. tons) in 1945, of which, due to high friability, only 12% was graded. It would not be reasonable to expect a higher proportion than this, however, since some of this coal, particularly types 501 and 601, is also suitable for coke manufacture.

If the higher output (34.3 mill. tons per annum) intended for the period 1942-52 is realized,* the total output from this field will be increased by as much as 40%, but the amount of "first-choice" gas coal will rise only by about 51% to 8.8 mill. tons. Figures suggest that supplies of coal to the gas industry need not be reduced until at least the last phase of the 100 year period. Of the Durham coal distributed for gas manufacture in 1945 only about 7% was actually required in the area, and the bulk was delivered to London (65%) and the South Coast (18%). It seems probable that this distribution will continue owing to the relative cheapness of sea transport. Information is not available regarding trends in ash content, but there is no reason to expect an increase in the coal as mined, while the cleaning of the 5.25 mill. tons of unscreened coal could lead to a lower general level of ash content.

Cumberland

The total reserves in Cumberland greatly exceed the planned output for 1942 to 2042, but consist mainly of under-sea coal which has not been fully explored. The coals are all of the same character (types 501 and 502) and are coking and gas coals. The mean annual output of the field is planned[6] at 1.8 mill. tons (1.3 in 1945, rising to 2.5 in 1960), and at least two-thirds of this is first-quality gas coal. In 1945 the gas industry received about half of this, mainly as graded coal.

Yorkshire

The East Midland coalfield covers 2,000 sq. miles of South and West Yorkshire, Derbyshire and Nottinghamshire, and its concealed eastern boundary is still undetermined. The seams in the field vary in general from highly caking coal in the north to completely non-caking coal in the south. In South Yorkshire, where a high proportion of the coal is of a type suitable for both coke and gas manufacture, the total planned output (100 years) of about 3,000 mill. tons is available from seams now being worked, while a further 1,800 mill. tons is available from other seams. The well-known seams of the exposed coalfield (*e.g.*, Barnsley and Parkgate) are expected to be exhausted within the 100 year period, and in later years will have to be followed into the concealed field. Of the planned output for 1942 to 2042, 10.4 mill. tons are " first-choice and 4.8 mill. tons " second-choice." In this coalfield, neither the total output, nor the distribution of types of coal in it can be appreciably different if the 1942-52 plan is followed. Of this large output of suitable coal, the gas industry received 5.0 mill. tons during 1945, of which 75% was graded coal of high quality, a proportion much greater than the 25% average for the field. A fairly high proportion of this (22%) was consumed around London and on the South Coast. It would seem that a higher proportion of the 10.4 mill. tons available could be given to the gas industry, but it must be remembered that the coking coals of South Yorkshire are drawn largely from the same coal seams, and a balance would have to be preserved between the requirements of the two industries. One obvious balance is found at present in the allocation of caking smalls to coke ovens and graded coals to gas-works, but in later years this may change if the use of the coke oven for gas manufacture continues to increase. The planned output of coking coals is about 4.0 mill. tons, but the actual consumption in Yorkshire in 1945 was 5.8 mill. tons; the difference of 1.8 mill. tons would have to be provided from the coals suitable for gas manufacture. This definite shortage of highly caking Yorkshire coal below 37% in volatile matter would seem to require some attention, possibly in the direction of influencing the mining programme to produce more coking coal in the next decade.

* It does not now seem that the planned outputs for this and other coalfields will be realized.

The West Yorkshire coals are in general of lower caking power than those of South Yorkshire and are unsuitable for coke manufacture; some seams are high-quality house coal (Haigh Moor), and some are reasonably good gas coals. The reserves are ample to realize the planned output for 100 years of 12.2 mill. tons per annum, of which 7.5 mill. tons are of a type suitable for gas manufacture. In 1945 the gas industry received only 1.63 mill. tons, of which over 80% was graded.

Separate information regarding the destination of the gas coals of South and West Yorkshire is not available for 1945, but is included below in the massed output of the Midland (amalgamated) district which also includes the outputs of the Derbyshire and Nottinghamshire field below.

Derbyshire and Nottinghamshire

This part of the East Midland field is south of a line running south-east from Sheffield. Its reserves have been estimated as equal to more than twice the total planned output, even excluding the seams which have not been evaluated and the concealed part of the coalfield to the east and south-east. The change in the caking power of the coal in the mains seams from strongly-caking (north) to non-caking (south) is again evident, so that the coal output contains all classes of coal from gas coal to non-caking industrial and house coal. Of the planned output of 25.1 mill. tons (1942 to 2042), 5.4 is "first-choice" and 2.1 "second-choice" gas coal. The 1942-52 plan shows very similar quantities. In 1945 the gas coal distributed was 2.34 mill. tons, of which nearly 70% was graded and 20% "large". The Nottingham coals are suitable only in graded form and for continuous vertical retorts, and have been used mainly in the county for the reason of ease of distribution. Some of the Derbyshire coals, for example, the Blackshale seam, are used as coking coals, either alone or in blends, but mainly the latter. Since these are drawn to the extent of 1.7 mill. tons from the 5.4 mill. tons above, the quantity available for gas manufacture is reduced.

Lancashire and Cheshire and North Wales

The Lancashire and Cheshire field has been extensively worked; owing to sever faulting and folding, the tendency has been to work small areas. Many of these will be worked out before the year 2042, and the new collieries planned will not make good the losses of output. If the 13.7 mill. tons planned for 1942-52 is achieved (1938 output was 14.4), the output will thereafter fall off considerably, since the planned average for 1942 to 2042 is only 10 mill. tons. Even this yield is open to some doubt owing to the "broken" nature of the strata. There are other reserves to the north-east, but they are not yet scheduled for working. The coals range from coking coals to high-volatile weakly caking coals. The planned output of 10 mill. tons contains 3.1 and 1.4 mill. tons, respectively, of "first" and "second" choice gas coals but a proportion of this is regrettably of too high sulphur content. In 1945 the gas industry received 0.94 mill. tons, none of which was exported outside the north-west region; two-thirds were graded. If this amount is reduced *pro rata* as production falls it will be insufficient to supply the gas undertakings of the two counties.

The planned output of the North Wales coalfield is small (2.1 mill. tons annually for the 100 year period) and is more than covered by visible reserves for 100 years. Mining will continue mainly in Denbigh, and the output will contain a high proportion of good gas coal. The proportion will gradually fall, however, since the new seams to be developed are all of lower caking power. The proportion of "first-choice" gas coal now is over 80% (equivalent to 1.7 mill. tons), but in 1945 the gas industry received only 0.18 mill. tons, and there is scope for the redirection of an appreciably greater quantity, particularly to augment the Lancashire requirements.

North Staffordshire and South Midlands

The North Staffordshire coalfield (100 sq. miles) is stated in Rapid Survey Report to be planned for an average output of 6.7 mill. tons, but the Regional Survey has anticipated that the annual output will increase in 1954 to 9.9 and in 1974 to 11.3, and the fall slowly to 9.3 by the year 2042. The Regional Survey has further assessed the visible reserves of this type of coal at 1,686 mill. tons—*i.e.*, to more than 200 years life at a rate of 6.7; further unassessed reserves are considered to be very large. The coalfield is very disturbed and wide variations of coal properties (in particular, caking power) occur over short distances; *e.g.*, six coal types have been found in one seam within the workings of one colliery. It is forecast that mining will soon extend into the deeper parts of the field, which will mean a gradual increase in the amounts of coking coals. In the first 10 years this type represents only about 2% of the planned output, whereas the average for 100 years will be about 20%. Even coking coal of the Durham type is available in this field, although its working is not yet planned. Of the planned output of 6.7 mill. tons, 2.6 are "first-choice" and 0.6 are "second-choice" gas coals, but during the period 1942-52 the amounts planned are appreciably less, perhaps by about 20%. During 1945 the gas industry received 0.75 mill. tons, almost entirely in large and graded form, which is only 30% of even the "first-choice" gas coal mined. Presumably the proportion will rise as the proportion of caking coal rises.

The South Midlands coalfield includes the fields of Warwickshire, Cannock Chase, South Staffordshire, and the Shropshire (Coalbrookdale, Forest of Wyre, Shrewsbury). The reserves of the whole area exceed the planned output, and the immediate ouput (12 mill. tons per annum) is planned to be gradually increased to over 14 by the operation of new collieries in virgin areas in Cannock Chase, South Staffordshire, and Warwickshire. Further unassessed reserves also exist beyond the range of present mining operations in all three areas.

None of this coal is suitable for gas manufacture by present methods.

Forest of Dean

This coalfield requires little attention owing to its small size and the approaching exhaustion of its main seam (High Delf). The planned output does, however, suggest increased rates of production to 937,000 tons in the 1942-52 period, which is much higher than the 100 years' planned average of 520,000 tons. In 1945 the field produced about 200,000 tons of gas coal, all of which was supplied to the gas industry. If the 1942-52 plan is realized, this quantity will be increased to 356,000 tons of "first-choice" coal with 180,000 tons of "second-choice" coal.

Bristol and Somerset

Most of this coalfield is concealed and its full extent is not known. The Regional Survey Committee considered only the 25 sq. miles of present workings plus a further 16 sq. miles out of a probable area of 260 sq. miles. New collieries are planned to counterbalance the loss of output from the Forest of Dean coalfield, and increase the present annual output of 0.8 mill. tons eventually to more than 1.5 mill. tons. This field is notable for the working of thin seams, some less than 24 in. The coal is mainly of the coking type with some gas coal, but has a high sulphur, and a fairly high ash content. It is, however, strongly caking coal (coke-type G_8+) and it would be most desirable to increase the coal-washing plant in the field and provide reasonably clean coal for the carbonization industries. In 1945 the field produced 612,000 tons, of which the gas industry received 236,000 tons, mostly as unscreened coal. Since the south-western gas region requires 1.4 mill. tons of gas coal annually, and South Wales requires help, there would seem to be a case for the accelerating of the proposed increase of output, particularly of coal at the higher levels of volatile matter, such as was formerly provided by the Great Vein and Hollybush seams.

South Wales

The present survey covers only two-thirds of the field, the remainder being almost untouched. In the areas now being worked the reserves are double the planned output for 100 years; the remainder of the field contains probably 50% more. It is noteworthy, also, that a further 10% exists in 12 to 24 in. seams, which may have to be worked eventually. The coal seams vary in properties gradually from bituminous gas coal in the east through coking coals and low-volatile steam coals to anthracite in the west and north-west. The planned output of all types is proportional, however, to the reserves, and it is anticipated that the proportion of each type will not alter appreciably in the 100 year period. Of the planned output of 32.9 mill. tons per annum, there are only 0.3 and 0.2 mill. tons of "first" and "second" choice gas coals, leaving ample reserves for the coke industry. During 1945 the gas industry of South Wales received 0.38 of this out of a total requirement for South Wales of 0.42 mill. tons. The difference was made up from Yorkshire (0.05) and North Wales (0.01), but could alternatively be made up by using local coal

Kent

The reserves of the Kent coalfield consist almost entirely of medium- and low-volatile coal of which the predominant group is coking-steam coal. In 1945 the gas industry carbonized 92,700 tons of unscreened coal, but it cannot be said that the use of this coal was more than a local expedient. Kent is, therefore, not a potential source of supply of London gas coal for existing processes, although the field is planned to produce eventually 4 mill. tons per annum.

Scotland

In the central coalfield the 1939 output cannot be maintained beyond 50 years owing to the exhaustion of the main seams of the Clyde basin. After this time, the falling output will be compensated by that of new collieries in East and West Fife, Clackmannan, Stirlingshire, and Ayrshire. The proportion of different types of coal will not, however, be greatly altered by this trend.

The gas-making coals of Scotland are better suited as graded coals for continuous vertical retorts than crushed coals for static retorts. Of the planned output of 23.8 mill. tons per annum, 2.1 and 1.4 are "first" and "second" choice gas coals. In 1945 the gas industry consumed 1.90 mill. tons of Scottish coal and 0.22 mill. tons from Durham and Northumberland. Since the coking industry required 1.2 mill. tons of the same types of coal, it is evident that a very high proportion of the coking and gas coal was reserved for the carbonizing industries, and that, if these industries are to expand, coal will have to be "imported." Although undesirable, this is not so serious as first appears, since seaborne coal is less expensive than rail-borne, and both sides of the country are accessible by sea.

(To be continued)

GAS UNDERTAKINGS' RESULTS

Wandsworth and District Gas Company: Dividends for the half-year ended June 30 at the following rates: On the Preference stock, £2%; on the Consolidated stock, £2 10s.%; both less income tax. Payment will be made on Sept. 1.

Yorktown

Yorktown (Camberley) and District Gas and Electricity Company.—Dividends for the half-year ended June 30, 1948, payable on Aug. 3, as follows: 5% Consolidated Preference Stock at the rate of 5% per annum; 4% Redeemable Preference Stock at the rate of 4% per annum; 5% Standard Consolidated Ordinary Stock at the rate of 5½% per annum; all less income tax.

Montevideo Gas and Dry Dock Company

Presiding at the annual meeting in London, Mr. Frank H. Jones said the 75th anniversary of the Company had proved a year of contrasts. While on the one hand the practical working of the undertaking had been satisfactory and full of promise, the financial results had been the poorest in the history of the Company. The Directors had decided to emark upon an expansion programme. Orders were placed for gas-making and distributing plant, but owing to present delays in manufacture and supply, the resultant advantages could not materialize before the end of 1949, or more probably 1950. However, with this knowledge they could work and were working their present plant at maximum capacity. This enabled them to connect 1,500 consumers during the year, to sell 14% more gas than in 1946, and to increase the average consumption per consumer. Dealing with the financial aspect, Mr. Jones recalled that he told the proprietors last year that they had petitioned the Uruguayan authorities for permission to increase their gas tariff. Unfortunately for one reason and another this was not granted until December, 1947. The increase demanded, and eventually granted, was necessary and reasonable, as evidenced by the fact that costs had increased, since 1939, for coal by 260%, for labour by 130%, and for gas oil by 90%. Nevertheless, with the present increase in tariffs, consumers were called upon to pay only an additional 30%. The Directors recommend a final dividend of 2%, tax free.

Hamilton Gas Department

Hamilton Gas Department showed a loss on the year's working of £1,003. To this sum is added a debit balance of £496 brought forward from the previous year, leaving a debit balance of £1,500 to be carried forward to the ensuing year. The Manager's report stated that owing to an alteration in the type of cookers now being produced under the gas industry's post-war planning the production of cookers had been confined to a high-grade, all-enamel type with oven control and plate rack, and the manufacture of the original black cookers had been abandoned. The new cookers were hired at 32s. per annum for the smaller size and 36s. for the larger size. The report stated that there were great discrepancies in the amounts paid by customers using the old type. Hire charges for ordinary consumers varied from 3s. 4d. to 8s. 8d. per annum (an average of 6s. per cooker), while prepayment consumers, who were charged 4d. per 1,000 cu.ft. of gas as an extra hire charge, paid an average of 11s. 9d. The consequence was that the more gas a person used the greater the hire charge he had to pay. The same thing applied to hired range plates, the charge to ordinary consumers being 2s. per plate, whereas plates on hire to prepayment consumers, where the charge was based on the amount of gas consumed, averaged 7s. At its last meeting the Town Council agreed that from Sept 1, 1948, charges should be standardized at 8s. per annum to both ordinary and prepayment consumers for the ordinary black cookers on hire and 4s. per annum for range plates. It was agreed that the charges for a black oven controlled type of cooker, now out of production, should remain at 10s. and 12s. per annum, according to size.

Stretford and District Gas Board

Gas sales in the year ended Mar. 31 amounted to 2,204,248,400 cu.ft., an increase of 9.26% on 1946-47, following an increase of 9.1% over the preceding year. Practically the whole of the increase was due to a bulk supply of 176,687,000 cu.ft. to the Altrincham Gas Company, but there was also a 1.31% increase in direct sales to the Board's own consumers, and the total for the year was an all-time high record. Total domestic sales were 1.12% below those for the previous year, but were still 11.85% above those for two years ago, the slight fall as compared with 1946-47 being entirely accounted for by the milder climatic conditions. Prepayment consumers actually purchased 1.83% more gas, but ordinary consumers took 5.06% less than in the previous year. Stability following the war years is now evident in the industrial demand, and Mr. J. Grayston, Engineer, General Manager, and Clerk, is of opinion that "as yet we have only scratched the surface of this demand." Total sales of gas for industrial purposes were 40,377,700 cu.ft., an increase of 3.68% over the previous year.

The Board has been unable to meet the demands of domestic consumers for the better class of apparatus, deliveries of refrigerators and gas fires leaving much to be desired. The incidence of purchase tax on certain types of equipment also had an adverse effect. There were no fewer than four changes in purchase tax affecting gas appliances during the year, all of them restrictive in effect and with the precise objective of reducing this business.

Total capital expenditure by the Board up to Mar. 31 was £1,325,129, and the net outstanding debt was £598,875, equal to 45.2% of the total expenditure. The net outstanding debt is equal to £272 per mill. cu.ft. of gas sold. Assets at Mar. 31 were £1,676,160, and liabilities £924,492, leaving an excess of assets of £751,668. The gross revenue balance for the year was £102,316, compared with £96,286, and the balance to appropriation account was £18,790, against £5,363.

Loughborough Gas Department

The Corporation has approved the annual report and financial statement for the year ended Mar. 31 submitted by the Engineer and Manager, Mr. John Corrigan. The financial results are very satisfactory, there being a gross profit of £25,069, from which £11,234 is required for loans repayment, interest, &c., and £10,011 for income tax, leaving a net profit of £3,824. Revenue contributions to capital during the year amounted to £1,639, leaving a net balance transferred to reserve fund of £2,185. The credit balance of reserve fund now stands at £12,759. From the 1947 balance, £6,124 was repaid to the Corporation in respect of previous aid from rates. Total capital expenditure to date is £374,338, including £21,957 expended during the past year. The outstanding loans amounted to £114,252, equivalent to £295 per mill. cu.ft. of gas sold. Gas manufactured was 1,873,957 therms, being an increase of 2.78% over that of the previous year. A review of the gas made during the past 10 years shows a progressive increase to 135%, from 799,789 therms in 1938 to 1,873,957 therms in 1948. The gas sold amounted to 1,742,490 therms, representing an increase of 3.8% in the Loughborough area, and 1.7% in the Quorn, Mountsorrel, and Barrow areas. Bulk supply to Shepshed U.D.C. commenced on Jan. 1, 1948, and amounted to 25,294 therms.

Working results show that 24,546 tons of coal were carbonized, yielding 76.34 therms per ton. Residuals returned 61% of the cost of coal carbonized. The average price received for gas from all sources was 12.96d. per therm, comparing favourably with 11.31d. per therm in 1938. The analysis of costs shows: Manufacture and maintenance of works and plant (net cost of gas into holder), 5.85d. per therm; distribution, 1.46d.; management, &c., 1.74d.; loans, taxes, rates, &c., 3.39d.; making a total of 12.44d. per therm. Sales of major gas appliances totalled 2,197, including 913 cookers, 462 fires and radiators, 645 washing machines, boilers, &c., and 177 water heaters. A greater portion of tenants of new housing schemes are specifying gas where the choice is optional.

Measurement Test

A test was recently carried out to ascertain the smallest measurement obtainable with a standard Metronic Mark II(S) differential movement. The test check was a 0-1 in. inclined gauge fitted with ¾ in. bore tube 15 in. long. This proved to be too slow and indefinite for direct checking, but calibration was effected by reducing the magnification of the instrument under test. The calibrating weight was then substituted by various lighter ones until a limit was reached when the instrument pointer gave full scale deflection (9⅜ in.) for a pressure of 0.05 in. W.G. Pressures down to 0.001 in. W.G. were clearly defined, but the movement was slow. An attempt to go still lower was baulked by the standard bearings in which friction then became appreciable.

Increasing the calibrating weight, it was found that the instrument became quite lively when full scale deflection was produced by a pressure of 0.1 in. W.G.; and as would be expected, this liveliness increased as the pressure range was stepped up to the maximum of 4½ in. W.G.

The instrument was then stood on the floor of a van where it was subject to jolting for two days. During this period it fell on its side and was left so for a day. It was then brought in for rechecking and was found to have sustained no damage whatever. The oil filling had not found its way into the pressure tubes—in fact, nothing adverse had occurred. The calibrating weight was removed, and the bell was in perfect balance. This test was intentionally conducted on very practical lines, such as the gas engineer could effect for himself without much trouble. The results reveal the suitability of Mark II(S) indicator for hard usage, and also for portable work. In addition, being unaffected by temperature changes, it is excellent for retort checking.

PLASTICS

Plastics in Scotland, the final report of the Committee on Plastics which is published by the Scottish Council (Development and Industry) at 2s., is largely concerned with the supply of raw materials to the plastics industry by the Scottish chemical industry, and with the manufacture by Scottish engineers of the moulds required. The report claims that until the Scottish industry is free from the necessity of importing raw materials, no firmly established plastics industry can be envisaged. It urges the greater use of gas by-products and in particular urges that ethylene should be recovered from coke oven gas, already practised elsewhere, which "could be done without seriously affecting the calorific value of the gas for most industrial purposes."

GAS STOCKS AND SHARES

Stock markets opened last week on a more optimistic note so far as the international situation was concerned and there was a small and steady rise in prices during the week. The approach of the holidays, however, limited the volume of business, and the markings on Thursday fell to 5,106, the lowest figure for more than three years.

An improved outlook in Berlin was reflected in increased firmness in British funds, the average of which rose by Thursday to 112.28, the highest since the end of June. There was also more cheerfulness in the industrial section and the level of prices here was higher than for several weeks, although there were no sensational changes.

In the gas stock market the number of bargains recorded was exactly the same as for the previous week. Imperial Continental were the only securities to show a reduction. The passage of the Gas Bill and the rejection by the Commons of the House of Lords' amendment concerning the basis for compensation appeared to have little effect on the stock market.

Despite the fact that no improvement was secured in compensation prospects, the few changes that were recorded in home gas undertakings were all in an upward direction. The week's changes were as follows:

OFFICIAL LIST

Cheltenham, 4 p.c. Perp. Deb. ...	95 —100	+ 2
Commercial, Ord.	90 — 95	+ 2
Hartlepool Gas & Water, 5 p.c. Ord.	93 — 98	+ 1
Imperial Continental, Cap.	108 —113	— 2
United Kingdom, 4 p.c. 1st Red. cum. Pref.	19/3 — 20/3	+ 3d.

Quotations on the London Stock Exchange

When last ex-Dividend	Dividends Interest.% Last Yr.	Prev. Yr.	NAME.	Quotations July 29
Feb. 25	4	4	Alliance & Dublin Cons. Ord.	19/ —21/
Apr. 28	5	5	Asscd. Gas & Water U'd'tgs Ord.	22/3—23/3
"	6	6	Do. Deferred	22/9—23/9
Mar. " 10	4½	4½	Do. 4½ p.c. Red. Cum. Pref.... ...	20/ —21/
"	4	4	Do. 4 p.c. Red. Cum. Pref.	19/ —20/
"	4	4	Do. 4 p.c. Irred. Cum. Pref.... ...	18/ —19/
Feb. " 11	7	7	Barnet Ord. 7 p.c. max.	153—158
Feb. 25	5	5	Bath Cons. Ord. 5 p.c. basic	103—108
Sept. 17	6½	10	Bombay, Ltd., Stock	46/- —49/-
Mar. 10	8¼	8½	Bournemouth Std. 5 p.c. sliding scale ...	165—170
"	7	7	Do. 7 p.c. max. div.	153—158
"	4	4	Do. 4 p.c. Pref.	96—101
"	6	6	Do. 6 p.c. Pref.	123—128
Feb. " 11	3½	3½	Do. 3½ p.c. Red. Deb.	97—102
June 16	4	4	Do. Perp. 4 p.c. Deb.	96—101
Feb. 25	5·35	5·35	Brighton, &c., 5 p.c. Std. Cons.	102—107
	6·3	6·3	Do. 6 p.c. Std. Cons.	110—115
June " 16	5	5	Do. 5 p.c. Perp. Deb.	116—121
Feb. 25	5	5	Bristol, Gen. Cap. 5 p.c. max.	112—117
June 16	4	4	Do. 4 p.c. New Deb. Red.	95—100
Mar. 10	7½	7½	Brit. Gas Light Ord.	127—132
June 16	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113
	4	4	Do. 4 p.c. Red. Deb.	92— 97
Feb. " 11	10	10	Cambridge U. & T. Orig. 10 p.c. Cons. ...	190—200
"	5	5	Do. 5 p.c. Cons. 'C'	95—100
"	7	7	Do. 7 p.c. Cons. 'B.'	135—140
Apr. " 14	4½	4½	Cape Town, Ltd., 4½ p.c. Cu. Pf.	18/ —20/
July 14	6½	6½	Cardiff Con. Ord.	118—123xd
Mar. 10	5	5	Cheltenham, 5 p.c. basic Cons. Ord. ...	100—105
June 16	4	4	Do. 4 p.c. Perp. Deb.	95—100
Feb. 11	5½	5½	Chester United Ord.	107—112
June 2	7	7	Colombo Ltd., Ord.	27/ —32/
	7	7	Do. 7 p.c. Pref.	22/6—24/6
Mar. " 31	5	5	Colonial Gas Assn. Ltd. Ord.	16/ —18/
	8	8	Do. 8 p.c. Pref....	23/6—25/6
Jan. " 28	5	5	Commercial Ord.	90— 95
June 2	3	3	Do. 3 p.c. Deb. Perp....	72— 77
Feb. 11	5	5	Do. 5 p.c. Irred. Deb....	107—112
"	6	6	Croydon sliding scale	119—124
"	5	5	Do. max. div.	102—107
"	4	4	Do. 4 p.c. Irred. Pref.	95—100
June " 30	4	4	Do. 4 p.c. Perp. Deb....	94— 99
"	5	5	Do. 5 p.c. Perp. Deb....	120—125
Feb. " 11	8	8½	Derby Cons. Ord.	133—138
June 16	4	4	Do. 4 p.c. Red. Deb.	93— 98
Feb. 11	5	5	East Hull Ord.	93— 98
"	5	5	East Surrey 'B,' 5 p.c.	98—103
"	6	6	Do. 6 p.c. Cum. Pref....	117—122
June " 30	5	5	Do. 5 p.c. Irred. Deb.	117—122
Mar. 1	6½	6½	East Wight Cons. Ord.	108—113
Mar. 10	5	5	Eastbourne 'A'	97—102
	3½	3½	Do. 'B'	94— 99
June " 16	5	5	Gas Consolidation Ord. 'A'	20/6—22/6
	5	5	Do. Ord. 'B'	20/6—22/6
May " 19	4	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6
Feb. 11	5	5	Gas Light & Coke Ord.	22/9—23/9
"	3½	3½	Do. 3½ p.c. max.	78½— 81½
"	4	4	Do. 4 p.c. Con. Pref.	99—102
July " 14	3½	3½	Do. 3½ p.c. Red. Pref....	97—100xd
June 2	3	3	Do. 3 p.c. Con. Deb.	86— 89
"	5	5	Do. 5 p.c. Deb.	104—107
"	4½	4½	Do. 4½ p.c. Red. Deb.	104—107
Mar. 10	3½	3½	Do. 3½ p.c. Red. Deb....	93— 98
	5	5	Gloucester Cons. Ord.	94— 99
Feb. " 11	4	2	Great Yarmouth (8½ p.c. max)	13 — 14
Feb. 25	7½	7½	Guildford Cons. Ord.	132—137
"	5	5	Hampton C't, 5 p.c. Cons. Ord.	95—100
"	5	5	Hartlepool G. & W. 5 p.c. Ord.	93— 98
May " 19	6	6	Hastings & St. L. (5 p.c. Std.)	97—102
	5	5	Do. (3½ p.c. Std.)	82— 87
June " 16	7½	7½	Holyhead & N. Wales Ord.	20/6—22/6
Mar. 10	5	5	Hornsey 3½ p.c. Std.	89— 94
	6·7/8	6·7/8	Do. 5 p.c. Std	110—115
May " 19	8¾	8½	Imperial Continental Cap.	108—113
July 14	3½	3½	Do. 3½ p.c. Red. Deb....	97—102xd
Mar. 31	7½	7½	Lea Bridge Co., Cons. Ord....	132—137
Feb. 11	5½	5½	Liverpool 5 p.c. Ord.	120—125
Mar. 10	7½	7½	Luton Cons. Ord. 'A'	148—153
"	6½	6½	Do. Ord. 'B'	115—120

When last ex-Dividend.	Dividends Interest.% Last Yr.	Pref. Yr.	NAME.	Quotations July 29
July 14	7	7	Malta & Med'n., 7 p.c. 1st Pref.	110—115xd
	7½	7½	Do. 7½ p.c. 2nd. Pref....	110—115xd
Feb. " 25	5 5/8	5 5/8	M.S. Utility 'A' Cons.	100—105
	3 3/8	3 3/8	Do. 'B' Cons.	68— 73
	5	5	Do. 'C' Cons.	102—107
	4	4	Do. 4 p.c. Cons. Pref.	96 —101
May " 19	2	4	Montevideo, Ltd. Ord.	110—115
Feb. 11	5⅛	5⅛	Newcastle and Gateshead Ord.	24/9—25/9
June 30	3½	3½	Do. 3½ p.c. Perp. Deb.	92— 97
Mar 10	7	7	Newport (Mon.) Cons.	95—100
June 16	5	5	Do. 5 p.c. Perp. Deb....	111—116
Mar. 31	6½	6⅝	North Middlesex 6 p.c.	123—128
	5	5	Do. 5 p.c. Pref.	105—110
Feb. " 11	5	5	Northampton Cons.	103—108
	10	10	Oxford, Cons. Ord.	200—210
June " 2	5⅛	5⅛	Plymouth & Stonehouse Ord	108—113
	8½	8½	Do. Addl.	13¼— 14½
	7⅞	7⅞	Do. New	12⅝— 13⅝
Mar. 10	5	5	Do. 5 p.c. Deb. Perp....	118—123
Feb. 11	7½	7½	Portsmouth & Gosport Cons.	146—151
	5	5	Do. 5 p.c. max.	101—106
	10	10	Preston 'A'	177—182
	7	7	Do. 'B'	125—130
June 24 46	2	4	Primitiva Holdings, Ltd. Ord.	10/6—12/6
June 16	6	6	Do. 6½ p.c. Red. Cum. Pref.	99—104
Feb. 11	5	5	Reading, 5 p.c. max.	97—102
Feb. 11	—	4	Do. 3½ p.c. Red. (Non-Cum.) Pref....	94— 99
June 16	4	4	Do. 4 p.c. Perp. Deb....	92— 97
Feb. 11	5	5	Romford, Ord.	110—115
Mar. 31	4	4	Do. 4 p.c. Debs. Red....	95—100
June 16	7½	7½	Severn Val. Ltd. Ord.	22/ —23/
Feb. 25	4½	4½	Do. 4½ p.c. Cum. Pref.	20/6—21/6
Feb. 25	6½	6½	Sheffield Cons....	142—147
June 30	4	4	Do. 4 p.c. Red. Deb.	94— 99
June 16	6	6	South East'n Gas Ltd. Ord.	21/9—22/9
Mar. 10	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	20/9—21/9
	4	4	Do. 4 p.c. Irred. Cum. Pref.	19/—20/-
Feb." 11	5	5	South Metropolitan Ord.	97 —100
	6	6	Do. 6 p.c. Irred. Pref....	123 —128
	4	4	Do. 4 p.c. Irred. Pref.	97 —102
June " 30	3	3	Do. 3 p.c. Perp. Deb.	81 — 86
July 14	5	5	Do. 5 p.c. Red. Deb.	97 —102xd
Jan. 28	5	5	South Suburban Ord. 5 p.c.	112 —117
	5	5	Do. 5 p.c. Perp. Pref....	108 —113
	4	4	Do. 4 p.c. Perp. Pref....	94 — 99
	3½	3½	Do. 3½ p.c. Red. Pref....	90 — 95
	5	5	Do. 5 p.c. Perp. Deb....	119 —124
June " 16	5	5	South West. G. & W. Ltd. Ord.	19/—21/-
Apr. 28	5½	5½	Southampton Ord.	102 —107
Feb. 11	5	5	Sunderland Ord.	113 —118
Jan. 28	6	6	Swansea Ord.	82 — 87
Feb. 11	4½	4½	Do. 5½ p.c. Red. Pref.	100 —105
	5½	5½	Swindon Cons. Ord.	114 —119
Mar. " 10	7	7	Tottenham Ord.	116 —121
	5	5	Do. 5 p.c. Pref.	108 —113
	5	5	Do. 5½ p.c. Irred. Pref.	120 —125
	5½	5½	Do. 4 p.c. Perp. Deb....	96 —101
June 2	4	7½	Tunbridge Wells, 4 p.c. Sliding	122 —127
May 19	6.85	7	U. Kingdom Ltd. Ord.	22/6—23/6
June 16	7	7	Do. 4½ p.c. 1st Cum. Pref.	22/—23/
May 19	4½	4½	Do. 4 p.c. 1st Red.Cum.Pref.... ...	19/3—20/3
	4	4½	Do. 4½ p.c. 2nd Non.Cum.Pf.... ...	19/ —20/
June " 16	4½	4½	Do. 3½ p.c. Red. Deb....	93 — 98
Mar. 10	3¼	3½	Uxbridge, &c., 5 p.c.Cap.	120 —125
May 19	6⅝	6⅝	Do. 5 p.c. Pref.	107 —112
	5	5	Do. 5 p.c. Perp. Deb.	116 —121
June " 16	5	5	Wandsworth Cons.	117 —122
Feb. 11	5	4	Do. 4 p.c. Pref....	97 —102
	5	5	Do. 5 p.c. Irred. Deb....	122 —127
June " 16	5	4	Do. 4 p.c. Irred. Deb....	95 —100
	5	5	Watford & St. Albans Ord.	117 —122
Jan. " 28	5	5	Do. 5 p.c. Pref.	106 —111
	5	5	Do. 5½ p.c. Pref.	129 —127
	5½	5½	Weymouth Ord. (5 p.c. Basic)	92 — 97
Feb. " 11	5	5	Woking District "A" Ord....	182 —192
	10¼	11	Do. "B" Ord....	128 —133
	7.35	7·7	Wolverhampton Cons. Ord.	119 —124
Mar. " 31	7½	8	York Cons. Ord.	97 —102
	5	5		